SUPPLEMENT.

The Mining Journal,

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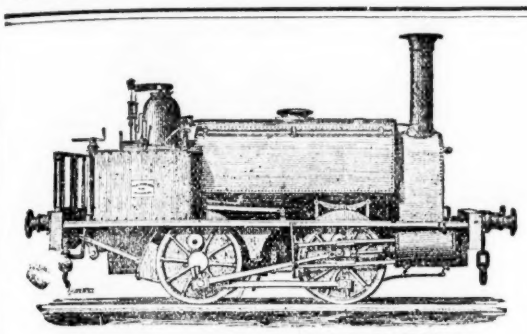
No. 2028.—VOL. XLIV. LONDON, SATURDAY, JULY 4, 1874. PRICE.....FIVEPENCE. PER ANNUM, BY POST, £1 4s.



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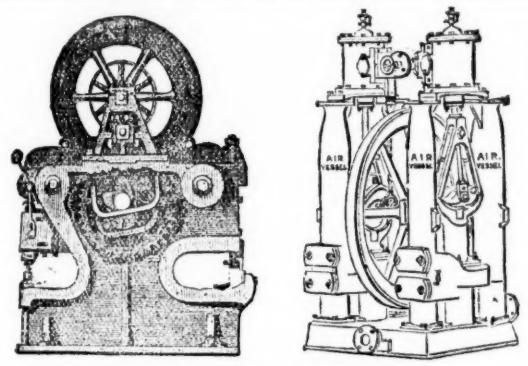

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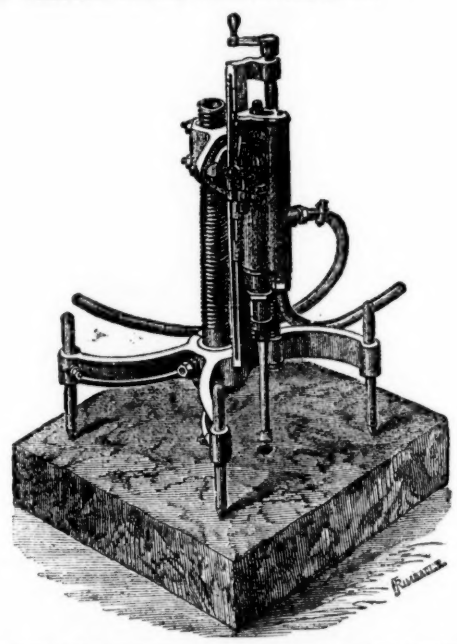

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COPY OF LETTER FROM SIR GEORGE W. DENYS, BART.

Draycott Hall, Richmond, Yorkshire, May 11, 1874.

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Messrs. McKean and Co. Yours truly, GEO. W. DENYS.

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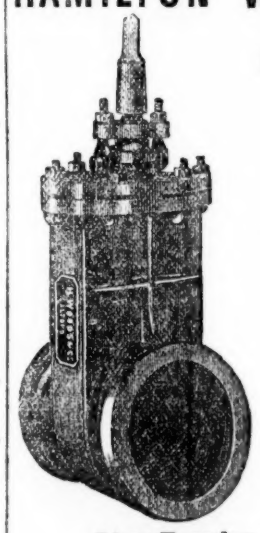

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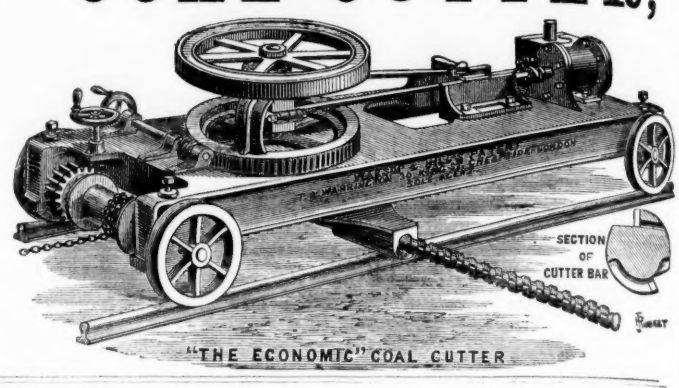

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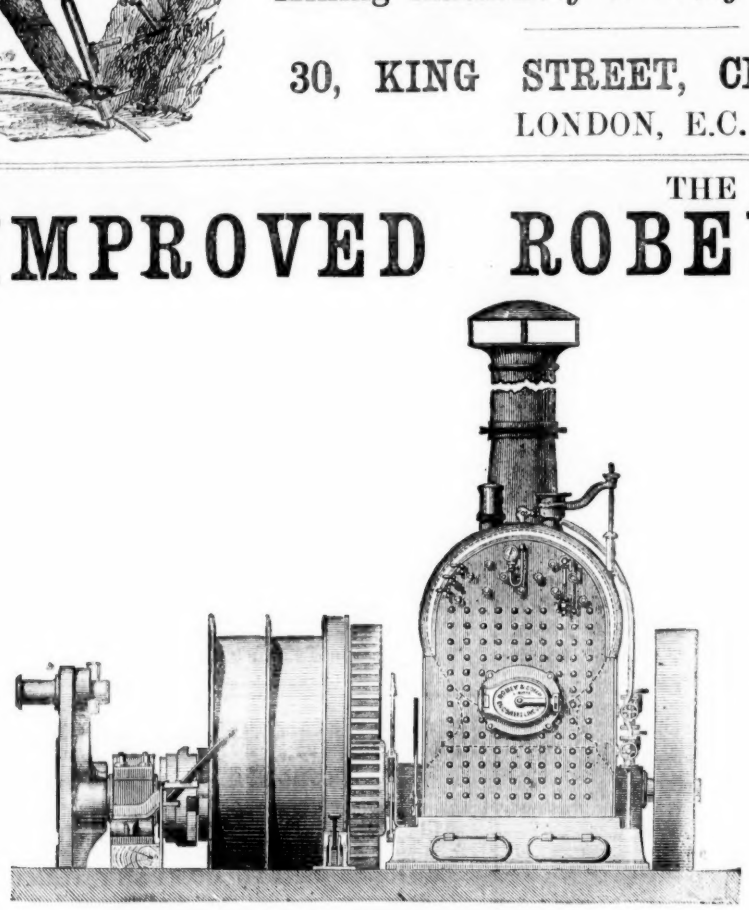

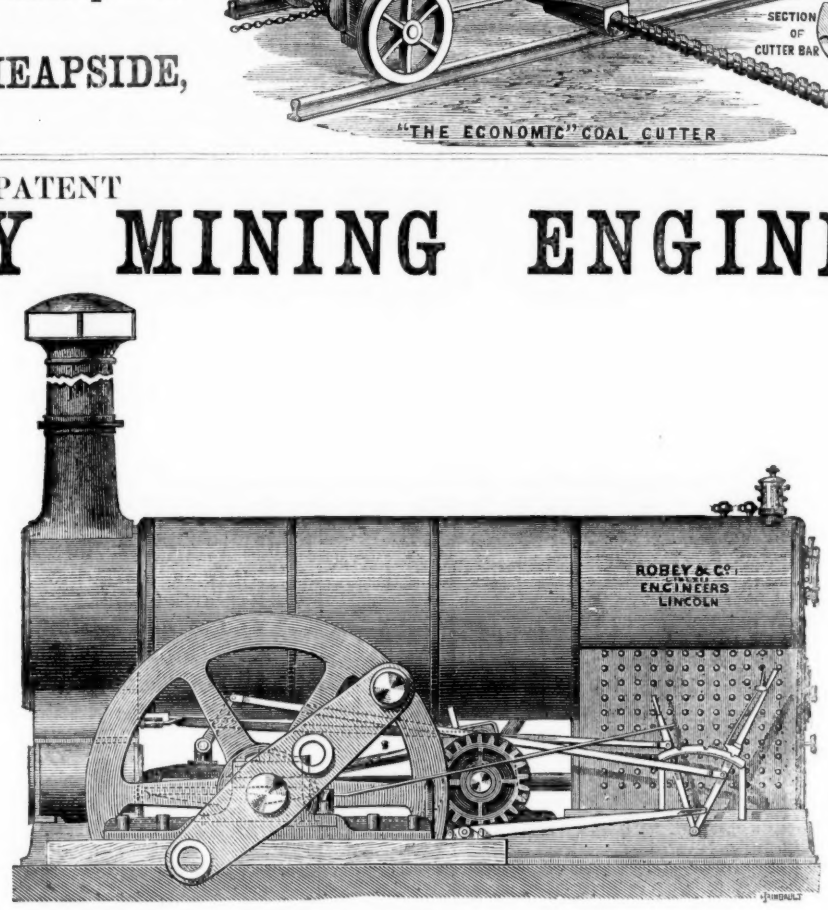

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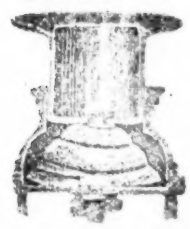

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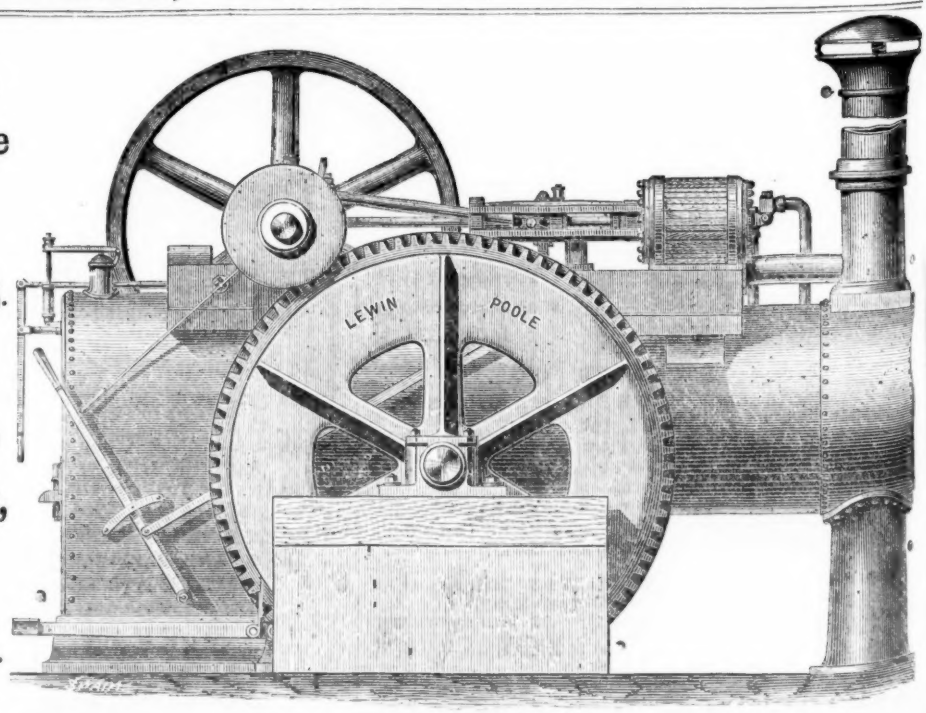

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The latest Baronet created by Her Majesty's Prime Minister, Sir George Elliot, is in some respects the most distinguished recipient of that honour. It has not been given to him to achieve victories upon the "tented field," to excel in the arts of diplomacy, to take rank as a great orator, or to sway the impulses of the multitude by the power of the pen. But in his own way Sir George has achieved many of those peaceful victories "not less renowned than those of war." To the science of mining he has contributed many valuable additions. As a mining engineer he stands almost without a rival in his own northern county; and as an enterprising and successful capitalist he has made a name that will not readily perish.

Sir George Elliot was born at Gateshead, on March 18, 1815. His father was employed as an ordinary workman at one of the collieries adjacent to that town; and when he came to an age when he could assist in winning the family's bread he obtained employment "down the pit," thus commencing life on one of the lowest rungs of the ladder. But the boy early exhibited proofs that he was "father to the man." His early education was very limited, and when opportunity offered he determined to educate himself. At the age of 17 he commenced the study of mathematics; and shortly afterwards, by his own request, he was allowed to withdraw from the pit, and enter the service of a surveyor in his native town. In his 21st year he was appointed as colliery overman, and in the following year he was made underviewer at Monkwearmouth Colliery—then one of the largest and most important collieries in the North of England. At Monkwearmouth he distinguished himself by assiduity and skill, to such an extent that he was soon made chief viewer of the colliery. In this capacity he became well known to most of the leading colliery owners of the North, and as his prudence and experience were tolerably well known he was often consulted in matters pertaining to colliery management and extension. Among others, Messrs. Backhouse and Mounsey, two Sunderland capitalists, sought his advice as to the purchase of Washington Colliery, then in the market, from Mr. Russel, of Brancepeth Castle. He not only recommended the purchase, but backed up his recommendation by offering to take an equal number of shares. This was his first step in the direction of becoming a colliery owner, and it proved a very well-advised and excellent purchase. Some years later Mr. Elliot leased the Usworth Collieries, near Newcastle, then in a very unprosperous condition; but by the judicious expenditure of capital he was enabled to make them one of the finest properties of the kind in the North of England.

In 1851 Mr. Elliot gave up his appointment of head viewer of the Monkwearmouth Collieries, and accepted the place of chief mining engineer to the Marquis of Londonderry. His lordship was not only one of the largest mineral owners in North Durham, but he owned then, as he owns still, very large and important collieries in the neighbourhood of Seaham Harbour, a port near to Sunderland, which has almost entirely sprung into existence within the last 20 years, and the development of which is no small degree owing to Mr. Elliot's exertions. In his new capacity, therefore, he had immense responsibility resting upon him; but he gained, and continued to hold to the last, the confidence and esteem of his noble employer, whose collieries in his hands became largely developed, and a source of immense income to their possessor.

Although he continued to act as mining engineer to the Londonderry family, Mr. Elliot gradually improved his own properties, until he became one of the largest colliery owners in the kingdom. In 1863 he became the owner of Penshaw Colliery, where he had been employed as a pit boy 35 years previously. Since then he has acquired the Powell's Duffryn, Aberaman, and Cwm Noel Collieries, in South Wales, and an interest in colliery properties in other parts of the country. In the North of England the largest property acquired by him is undoubtedly the Usworth Collieries, which are situated near Washington, and within 12 miles of Newcastle-on-Tyne, which is the shipping port from whence their produce is dispatched to all parts of the world.

The coal raised at the Usworth Collieries is of two kinds—gas and steam coal. The Low Main coal is specially adapted for steam-raising purposes, and is greatly in request therefor. The coal raised from the Maudlin and Hutton seams is used for gas making, and a large quantity, averaging 500 to 600 tons per day, is sent to London, to be used in the gasworks of the metropolis. The Usworth Colliery has three shafts. One of these is the downcast, 12 ft. diameter; another is the upcast, 10 ft. diameter; and the third is the air pit, sunk at a distance of fully 50 yards from either of the other two. In connection with the latter shaft a Guibal fan is in operation, 45 ft. diameter and 12 ft. in width. This fan works at the rate of 45 revolutions per minute, and circulates from 200,000 to 250,000 cubic feet of air per minute. It is worked by two engines, each having a 36-in. cylinder and a 3-ft. stroke, and working directly to the shaft and the fan. Sir George Elliot was one of the first to see and recommend the advantage of mechanical over the old system of furnace ventilation, and his example in the introduction of the Guibal fan has been largely followed by other colliery owners in the North. There are three principal seams worked at Usworth—the Hutton, the Maudlin, and the Low Main. The Maudlin and the Hutton seams are worked on the bord and pillar system, while the Low Main seam is worked on the plan of long wall. The dip of the measures varies from 3 in. to 5 in. per yard. In all the seams the cleavage runs nearly north and south, the principal workings being driven at right angles to to this inclination. The underground workings are very extensive—so much so as fully to justify the remark made by the owner in giving evidence before the committee appointed to enquire into the probable extent and duration of our coal supplies, when he said that it was almost possible to get underground from Durham to Newcastle—a distance of nearly 20 miles. The coal is won at a depth of 200 yards from the surface. The gross daily produce of the Usworth Colliery is about 1500 tons, or close on 10,000 tons per week, of which large quantities about 700 tons per day are raised from the Low Main, 170 fathoms in depth, and from 500 to 550 tons per day from the Hutton seam, 200 yards in depth. Over a thousand men and boys are employed in connection with the colliery. The machinery is all of a high class, and chiefly made by Messrs. Black, Hawthorn, and Co., of Gateshead. A notable speciality of the workings is the adaptation of all the main roads for engine-power, the yield of the different seams being brought out by an engine plane carried through the Low Main seam, and connected with the other two seams by rise drifts which serve as self-acting machines.

Sir George has not only recommended but he has also designed mechanical appliances calculated to improve the science of mining and the health and safety of the miner. One of his inventions (described in the *Mining Journal*, of Nov. 5, 1870) has been adopted in not a few cases for the better ventilation of mines, and is also applicable to the ventilation of ships and public buildings. But it is more especially on the subject of the internal workings of the Durham and South Wales collieries that Sir George has come to be regarded as an authority. At his collieries at Cwm Noel, at Upper and Lower Duffryn in South Wales, and in Durham he has made a series of elaborate and careful experiments with the view of testing the effects of the external air upon the internal temperature of a colliery, and ascertaining how far it is possible to modify the inimical conditions to deep coal working. As a result of these experiments, he has found that the increase of temperature in a mine is determined by the depth from the surface, and has no reference to the depth below the level of the sea; that under all conditions there is a steady increase of something like 1° for every 60 feet of descent; that the increase of temperature must be counteracted by increasing the quantity of air; and that improved ventilation would enable a miner to do his work at a higher temperature for the same remuneration as he now receives. He has also arrived at the conclusion that the use of air machines will entirely supersede the use of horses underground, although he does not expect much relief from the use of coal-cutting machinery. All these, and other not less valuable conclusions, were stated by Sir George to the committee appointed to enquire into the probable extent and duration of our coal fields, and his evidence was esteemed more valuable and important than that of almost any other witness, seeing that the range of his experience was so large and ample. In the Coal Commission of 1873 Sir George also found a place, and here, again, he exhibited a vast acquaintance with all matters pertaining to mining engineering.

In 1849 Sir George entered into partnership with Sir Richard Glass, as a telegraph cable and wire-rope manufacturer. As many of our readers will be aware, the firm of Glass, Elliot, and Co. has manufactured not only the Atlantic Cable, but the Franco-American, the British Indian, and the British Australian cables. Indeed, there is no telegraph cable laid of any consequence in which they have not been more or less concerned.

We cannot deal here with Mr. Elliot's parliamentary career, although we may be permitted to remark that while he was in the House of Commons, between 1868 and 1873, no one did more to forward the interests of mining, and to put the Mines Regulation Act on a just and sound basis.

In the general election of 1874 Sir George Elliot lost his seat, but subsequently Messrs. Bell and Palmer, the candidates then elected, were unseated on petition, and a fresh election became necessary. This second election resulted last week in again placing Sir George in the House of Commons, where the mining and manufacturing interests of his country may expect that he will continue to render the same yeoman service in the future that he has done in the past.

THE LIFE AND LABOURS OF ARTHUR WOOLF, THE INVENTIVE CORNISH ENGINEER.

An interesting paper, "On the Life and Labours of ARTHUR WOOLF, of Camborne," by Mr. S. HOCKING, C.E., of Lower Rosewarne, near that place, his nephew and pupil, was read by Mr. J. H. COLLINS, F.G.S., the honorary secretary of the Miners' Association of Cornwall and Devon, at its quarterly meeting, which was held in the large museum of the Royal Cornwall Geological Society's building, at Penzance, on Tuesday last. The following is an outline of the paper:—

Woolf's biography has not yet been written, and he is, therefore, less known to Cornishmen than some of his contemporaries, although he conferred substantial benefits on his native country and the world in general by his improvements in the steam-engine. He was baptized at Camborne Nov. 4, 1766, his father Arthur Woolf, being a tal carpenter. The future engineer was bound apprentice to a carpenter and joiner, at Pool. Having served out his indentures he removed to London, and soon obtained employment as a millwright, which led to a situation as first-class man at Bramah's celebrated engineering works at Pimlico, where the talented Henry Maudslay was his fellow-workman. Together they left Bramah's, each to start as an engineer on his own accounnt. In 1795 a Durham colliery owner employed Woolf to erect a second-hand Bolton and Watt engine at Newbottle, on the condition that he was to make it consume less fuel. This he successfully accomplished, his early familiarity with Cornish steam-engines having added to his fitness for such an undertaking. Having the next year assisted Hornblower over a difficulty with his two-cylinder engine at Meux's London Brewery, he was appointed resident engineer, and held the situation for nine years. In the year 1806 he started, with a Mr. Edwards, a steam-engine factory on his own account. While at Meux's brewery he patented a cast-iron boiler to resist high-pressure steam. The brewery books show that he was resident engineer there from April, 1797, to October, 1806—dates which are relied on to correct an influential statement that he was a workman of Trevethick's, and sent to London with one of that Cornishman's high-pressure engines, and was, as late as 1803, paid by Trevithick at the rate of 30*l.* a year. Woolf was not in the country at that time, and was paid 3*l.* a week by Messrs. Meux and Co. In 1804 he patented his mode of working high-pressure steam, and Watts's condensor to Hornblower's two-cylinder engine. With one of these, a 36-horse power, he did the work of the brewery, consuming 36 bushels of coal per day. After he left, a 30-horse power Bolton and Watt replaced his engine. To effect the same amount per diem it consumed 84 bushels of coal. In a subsequent corn-grinding test before Trevethick, Penn, and Henry Harvey, Woolf's engine ground above 17 bushels of wheat for each bushel of coals consumed; while a Bolton and Watt ground not quite six bushels of wheat for each bushel of coal: or 36,000,000 to 40,000,000 of duty to 12,000,000 or 13,000,000. In 1812 Woolf returned to Cornwall. His partner established himself in France as a maker of Woolf's engines and boilers. The boiler is still the type of those in general use in France, and, Mr. Hocking adds, "Ought to be better known in England."

Stamping of ores by steam-power was first introduced by Woolf; he erected one of his patent engines for that purpose at Wheal Fanny, now the Carn Brea Mine, in 1813-14, afterwards in several other mines. The large-size pumping-engines erected at the Wheal Abraham and the Wheal Vor in 1814 and 1815, successfully proved the value of Woolf's inventions and established his reputation as the ablest of Cornish engineers. The very great advance he made in the duty done by a bushel of coal, raising it from about 2,000,000 to 50,000,000, served to stimulate other engineers, as will be seen from the following quotation from an article on the History of the Cornish Engine, by James Sims, C.E., published in the "Mining Almanack" for 1849. "I commenced engineering" says M. Sims, "in the year 1811, at a period when the steam-engine was in a very rude state, and from that time up to 1814 little or no improvement took place." The average was for 1812, 19·3 millions; for 1813, 19·5 millions; and 1814, 20·6 millions. In the latter part of 1814 Mr. Arthur Woolf erected one of his patent combined cylinder engines, and with great success. The duty of Woolf's engine having risen to 52·3 millions of pounds lifted one foot high by the consumption of one bushel of coal; and he having made several important improvements in Boulton and Watt engines, by causing them to work more expansively, by using higher pressure steam, awaked the whole of the Cornish engineers to a new era in steam-power. This statement must be considered highly complimentary to the abilities of Woolf, coming, as it does, from one of his most active opponents in engineering practice in Cornwall. Early in the year 1815 Woolf was employed by the managers of Dolcoath Mine to report upon the efficiency of the steam-boilers belonging to their large engine. As there was a difficulty in getting steam from them in sufficient quantity to meet the requirements of the engine, which was getting heavier loaded as the mine deepened. He found the boilers of ample capacity, and coal enough consumed to give the necessary quantity of steam; and the fact of their not doing so was proof to him that much of the heat was escaping to the chimney, which on examination he found was the fact. He simply removed the outlet passage to the chimney from the highest part of the flue to the lowest, when it was found the steam-giving power of the boilers under the altered condition had so increased as to render it unnecessary to add the contemplated new boiler.

Dolcoath new engine, erected by Jeffrey and Gribble in 1816, has often been referred to to show how near other engineers, using single cylinders (Boulton and Watt) form, approached the duty done by Woolf's two-cylinder engines. Woolf found in Gribble one of the most promising young men for his profession he met with in Cornwall, and ever felt a pleasure in assisting him. Every drawing for the construction of the said Dolcoath new engine was by Gribble submitted to Woolf, as his personal friend, for approval, &c. Hence the complete success of this engine, for it was constructed in conformity with Woolf's patent, dated June 7, 1804, wherein a portion of his specification reads as follows:—"Fifthly, with regard to steam-engines in which the separate steam measure may not be thought advisable, the same may be improved by the application of my aforesaid discovery—by making the boiler and steam-case in which the cylinder is enclosed much stronger than usual, and by altering the structure and dimensions of the valve admitting steam from the boiler into the cylinder in such a manner as that the steam may be admitted very gradually at first, afterwards more freely. The reason for this precaution is this—steam of such great elastic force as I employ, if admitted suddenly into the cylinder, would strike with a force that would endanger the safety and durability of the engine. Due and effective means must be used to keep up the requisite temperature of all the parts of the apparatus into which the steam is admitted, not intended to be condensed." At the time Woolf commenced his practice in Cornwall there was no engine manufactory in the county that could supply such large castings as he required; they had to be brought from Wales, and were fitted up on the mines where they were to be employed. Most of the wrought ironwork was forged, as well as fitted also, on the mines. Woolf had to train a staff of skilled workmen, selected from the most intelligent youths of the day. He was himself a first-class worker in metal and in wood, and was admirably endowed with qualities as a teacher. He constructed a good assortment of machine and hand tools, and worked them himself, with the help of his young men, until he could safely trust the tools in their hands.

Thus, in the Wheal Abraham commenced the school of mechanics that has since furnished Cornwall and many other countries with skilled workmen and engineers. Seeing the need of a good engine manufactory in Cornwall, Mr. Woolf first thought of establishing one himself, but was persuaded by Messrs. Harvey and Co., of Hayle, to forego such intention, and give that company the benefit of his knowledge in the enlargement of their little growing establishment, so as to make it serve his purpose. This work he undertook to do, and became the superintendent of the establishment; and this office he held up to the time of his retirement, in 1833. The considerable reputation acquired by Messrs. Harvey and Co. up to that date was mainly due to the labours of Mr. Woolf.

Mr. Woolf said, on being complimented in public company on his success in raising the duty from 20,000,000 to 52,000,000, that what he had done in that direction was but the starting point in progress, that some of the boys he had in training would make the steam-engine do 100,000,000, which prophesy has been realised. Of Mr. Woolf's ability as engineer and teacher of mechanics no man had better opportunities of judging than Mr. John Taylor, the able manager of the Consolidated and United Mines, in Gwennap; from whose statement, published in the work on Cornish Engines, by Mr. Pole, the following extract is taken:—"He (Mr. Woolf) made many valuable alterations in the details, among which may be mentioned the remodelling of Mr. Hornblower's double-beat valve into the present improved form, introduced a style of manufacture greatly superior to any that had been before known in the county, and formed, in fact, a new school of engineering there. He seemed to possess an almost inexhaustible mine of invention. His improvements in detail were almost ennumerable, for scarcely a single part of the engine could be named, however apparently unimportant, which did not receive some beneficial alterations at his hands. His talent for contriving tools was very great, and he seemed to have almost an intuitive perception of the best methods of performing operations and processes of all kinds."

In the limited space allowed for this paper a bare list of Mr. Woolf's various engineering labours cannot be given. There is, however, one little machine he erected in Messrs. Bolitho's tan-yard, in 1828, if working still would be a fit subject for description by a Penzance pupil for next year's report. It consists of pumps to drain the tan-pits, worked by a power at a distance, communicated through a column of water in a close pipe.

Mr. COLLINS remarked that one of the reasons why Woolf's labours were not better appreciated in Cornwall was that his inventions very largely consisted of improvements in detail. He made possible some of almost the wildest speculations of his neighbours by introducing perfect workmanship and by modifying details, so that one thing did not clash with the other. It was not so much that he introduced entirely new things as that he carried them out to a successful issue. If they examined the Cornish pumping-engine of the very best construction at the present time they would find it full of small improvements, as they might seem, taken one at a time, but which in the main made that 100,000,000 of duty possible when Woolf himself only looked for a duty of 52,000,000. The man who does many small things is a greater benefactor to his species than he who strikes out an entirely new path, but does not know how to follow it up. (Hear.)

Thanks were voted to Mr. Hocking for his paper.

*** In the Supplement to next week's Journal we shall publish the interesting letter from Mr. Charles Fox on Practical and Scientific Suggestions as to the Present and the Future of Cornish Mining, with the discussion thereon.

THE IRON DEPOSITS OF CORNWALL.

Permanent advantage will probably accrue to Cornwall from the recent depression in the tin and copper trades owing to the attention which it has caused to be directed to the iron deposits. It appears, says Mr. J. H. COLLINS, F.G.S., in a paper recently read by him before the Miners' Association of Cornwall and Devon, on "The Great Perran Iron Lode," to be characteristic of Cornwall to have great faith in its existing works and industries, but very little in those which are as yet undeveloped. The former neglect of copper and china-clay is referred to, and he thinks that the instances given are precisely paralleled in the present condition of iron mining in Cornwall. Nearly 40 years ago, with reference to the now well-known Perran lode, Mr. W. Jory Henwood wrote—"At the eastern extremity of Ligger Bay is a large vein bearing S.E., N.W., and dipping south 50°; it contains hematite, specular and earthy brown iron ore, quartz, and slate, has many cavities lined with crystals of quartz, and is traversed by many small quartz veins. Sir H. Delabeche, in 1839, wrote that there could be little doubt that a large supply of good hematite iron ore could be readily obtained from Cornwall and Devon if the necessary demand existed." No truer description, continues Mr. Collins, of the Perran lode than that given by Mr. Henwood could be given now in the same number of words, yet among the miners of Cornwall some do not believe there is any considerable quantity of iron ore there or in the county. Others doubt as to the quality—nearly all assert that it cannot be worked at a profit. I believe that these are all wrong, that the quantity is enormous, the quality mostly all that can be desired, and that very large profits are to be made by working the ores.

Iron ore in Cornwall almost always occurs in lodes, and these are very numerous, and often astonishingly persistent. Many are known to extend for several miles in a direct line, and the depth to which the ore holds down is quite unknown. In many respects, however, the Perran lode differs from most of the others, especially in direction, size, underlie, and in the nature of its contents. The Cornish iron lodes have usually a direction a few degrees west of north—average, perhaps, 3 to 4 ft. wide, underlie about 1 ft. in a fathom, and contain either red or brown hematite. Many of them are, in fact, the cross-courses of their respective districts. On the other hand, the Perran lode bears about 35° N. of W., averages perhaps 30 feet in width for a course of several miles, underlies from 3 to 4 ft. in a fathom, and contains large quantities of carbonate of iron or spathose iron ore. It is first seen in the cliff, as stated by Mr. Henwood, and here it is above 100 ft. wide, consisting of two great branches, divided by a horse of killas; from here it may be easily traced inland for a distance of four miles to Deer Park, where it takes a turn—at first directly east, and afterwards some degrees N. of E., so proceeding in a curve as far, it is said, as Grampound, a distance of about 12 miles. It is, however, of little value so far as is yet known after the first four miles, and it is to this portion, therefore, that Mr. Collins directs his attention.

This great lode has been partially worked at intervals for about 20 years, and in that time, perhaps, 200,000 tons of ore—certainly not more—have been taken out and sold. The cost of carriage rendered the working of the mineral unremunerative; but the quality seems to have been satisfactory, for Mr. Menelaus, of Dowlais, was "much pleased" with 40,000 tons supplied to him in 1865; and Mr. Henry Bessemer visited the mines about the same time, and pronounced the ore to be specially adapted for his process of steel making. At present the lode is being vigorously worked by the Cornish Consolidated Iron Mines Corporation, and recently a railway connecting the mines with the fine natural ports of Fowey and Falmouth on the south coast, and passing through some of the finest mineral districts in the world, is now being constructed. With regard to the present state of the works on the great iron lode, Mr. Collins states that at the cliff itself, upwards of 180 ft high, where the lode divides into two, two large gangs of men are daily engaged in quarrying brown hematite of excellent quality. The old adit here has been straightened, extended, and widened to allow of the use of tram wagons, and a shaft has been sunk inland—No. 1 shaft—communicating with it and ventilating it. In the adit men are now stoping ore at three different points, and tramming it out to add to the large piles outside. At this point the Huel Golden lead lodes cross the iron lode, and some fine stones of lead have been already broken in the iron ore. A little further inland a fine shaft, known as Borlase's, has been sunk about 15 fms., and a level driven to communicate with a large excavation (the Big Iron Pit) on the south branch of the lode. Several other trial shafts have been sunk still further inland, all of which prove the continuity, size, and value of the lode. Of course, there are variations in width and mineral character, and the lode does not follow a perfectly straight course, but it is everywhere a fine lode; this part of the sett is called Gravel Hill; it was formerly known as the Penhale Iron Mine.

To the eastward of these first workings in the Gravel Hill sett the Halwyn sett occurs, and this is also held by the same corporation, and has been proved by them most satisfactorily. A vertical shaft has now been commenced on this part of the property. The Halwyn sett is bounded on the east by the Mount Mine, where very fair ore is now being raised for shipment at Truro; the only machinery here is a horse-whim, by which the ore is raised from a depth of more than 20 fms. No doubt both output and appliances will be much improved as soon as the railway is open for traffic. Still further east the two great excavations at Treamble are situated; here may be seen large parties of men constantly breaking down brown hematite and white spathose iron ore in rocks, each of several tons weight. Horses are actively employed in tramming the ore out to the piles; more than 20,000 tons of very fine ore may be seen awaiting the completion of the railway; a branch of the new Newquay and Fowey Railway comes here direct to the quarries. Each of the great quarries is crossed by a very promising lode of silver-lead—the Nos. 1 and 2 lodes of the Great Retallack sett, adjoining to the north and east. These lodes appear to be heaved to the right some few fathoms, but the junction is rather obscure. A little west of No. 1 lead lode, just mentioned, is a deposit of unctuous black flookan, much resembling graphite, which contains 3 to 5 per cent. of free carbon.

At Great Retallack the lode is found to be several fathoms wide, and as elsewhere to make in places very near the surface; at one point it has been sunk upon by former workers to a depth of 40 fms.; it was found to be rich for iron, with a little blende, for the first 25 fms., but at a greater depth the blende increased, and for several months upwards of 500 tons per month were raised and sold at a very low price. In this mine, at Stephens' shaft, a great mass of hornblende rock was met with in sinking. At Duchy Peru Mine, east of Great Retallack, the old workings on the lead and copper lodes were carried to a depth of 50 fms. on the iron lode between 20 and 30 fms.; here the celebrated Peru lode comes in contact with the great iron lode. This Peru lode was only a few inches wide, but it yielded silver-lead of very great richness, some parcels containing 2000 ozs. of silver per ton of ore. Some of the silver occurred in visible metallic fibres as native silver. Very fine white spathose ore is now being broken in large quantity in the stopes above the 40, west of Vallance's shaft; some of this is raised at the old engine shaft by means of a pair of winding-cages; the second pair at work in the county. Magnificent cellular brown hematite is also being raised in quantity at Carter's shaft—a shaft on the western boundary of the Duchy sett, and from here a level is now being driven east to meet the 40, west from Vallance's; the ore here contains several ounces of silver to the ton, but not enough to pay for extraction. Much of the ore contains large vughs; many of these contain a loosely-fitting kernel of white carbonate of iron; the space between the kernel and its enclosing shell is often filled with water, which is quite clear and tasteless. At 20 fms. from surface, east of Vallance's shaft, is a remarkable hot chamber or end. The temperature was about 124° Fahr.; the temperature on arriving at the surface was 64°. The lode is here very large, and is throughout permeated with small crystals of sulphide of iron, mostly iron pyrites; the whole lode appears to be rapidly crumbling down, and is moist with free sulphuric acid, which burns the clothes of the men who venture in. The extreme poverty of the air is also no doubt due to the same cause—the absorption of the oxygen by the sulphur to form sulphuric acid. The ventilation in the neighbouring cross cut is exceedingly good, and the end in question is driven but a very few fathoms in. In the 40, both east and west, much of the killas is black and shining, much resembling the coal shale which so commonly occurs in the coal measures. The black colour is due to free carbon, but he has seen no trace of animal or vegetable structure; this black shale is often pyritous when it contains distinct traces of silver. The killas country about the great lode at Duchy Peru seems to be much disturbed: south of the lode it is hard, and appears to dip towards it, but next the lode it is soft, and dips with it.

A little more than a mile further east, at Wheal Deer Park, extensive excavations again mark the position of this greatest of the Cornish lodes, and no doubt large quantities of ore will be here, too, raised on the opening of the railway. The gossan of the lode is very well seen in the railway cutting at this point, and also close to the new bridge at Fiddler's Green, about two miles further on. Beyond Deer Park the outcrop of the lode is seen on Penhallow Moor. Here the Cornish Consols have worked to some small extent, but at present the works are in abeyance. The general characteristics of the great lode appear to be somewhat as follows:—The upper portion—which, like many other lodes, underlies more rapidly than the deeper parts—appears to be composed of an immense mass of brown hematite, sometimes cellular, sometimes compact. Beneath this—sometimes only a few fathoms from the surface, but always before the sea level is reached—the lode appears to be composed entirely of spathose iron. Everything in the appearance of the ore seems to show that the brown hematite results from a slow change of the spathose ore, which is even now going on. In places this change is no doubt accelerated by the heat produced in the oxidation of pyritous matter, and perhaps by the galvanic action first discovered in lodes by R. W. Fox, F.R.S., many years ago.

It is a remarkable fact that the great bunches of ore in the Perran lode appear to occur just where it is crossed by the very numerous north and south lead lodes of the district. As examples, he refers to the Wheal Golden lodes which cross at the cliff, where the lode is 100 ft. wide; the Trebisken and Trebellen lodes, in Mount Mine; the Great Retallack lodes, in Treamble; the Duchy Peru and Wheal Hope lodes, in Duchy Peru; the Shepherd's lode, near Deer Park; Cargoll lode, in Penhallow Moor, &c. The favourable effect of these junctions also shows itself in the lead lodes, which all appear to contain considerable or even very large proportions of silver near their junctions. In the occurrence of large masses of pyrites, blende, yellow copper ore, and argentiferous galena, not only at the intersections, but occasionally in the lode itself away from these intersections, there are indications that the lode in depth—say, 100 to 200 fms.—will contain chiefly the ores of the more

valuable metals, the iron ores simply forming an immense gossan; and if so it will, he believes, be a richer series of mines, perhaps of copper, more probably of lead, than Cornwall has yet seen. Be this, however, as it may, the present proprietors have here a very rich property, as the slightest consideration will show.

It is well known that the average produce of the Cornish tin ores as brought to surface is in the western mines only about 1½ per cent. of black tin, or (say) 30 lbs. per ton of stuff sent to the stamps. In the eastern mines, which are often scarcely more than quarries, the produce is no more than from 4 to 6 lbs. per ton of stuff in many cases. The value of this tin in the stone will certainly be less than 20s., often not more than 15s. per ton of ore. Now for this sum, if there be any considerable quantity, miners are content to raise stuff from an average depth of, perhaps, 100 to 150 fms., to pay all expenses of draining these deep mines, and to subject the ore to a most elaborate series of stamping and dressing operations. Here, on the other hand, the ore is close to the surface in immense quantity; 6d. or 1s. per ton will pay for all the preparation it requires ere it is sold, and the value all round cannot be estimated at much less than 16s. per ton at the shaft's brace. At present brown hematite will fetch freely 17s. 6d. per ton, f.o.b.; calcined spathose considerably over 20s.

The paper gives a very complete account of the iron deposits of the district, and will prove alike valuable to the geologist who reads it merely for its scientific interest, and to the practical mine adventurer desirous of turning the knowledge obtainable from it to commercial advantage.

MINERS' ASSOCIATION OF CORNWALL AND DEVON.

The results of some of the examinations of the various classes held in May, in connection with the Department of Science and Art, South Kensington, have been received, and are as follows:—

REDRUTH CLASS.—Mineralogy: W. L. Chegwidden, first class, advanced stage; Wm. Rich, H. L. Passmore, and H. Tregaskis, second class advanced; W. L. Rowe, and G. H. Richards, first class, elementary stage; James Hocking, C. Berringer, R. H. Patterson, and Thos. Passmore, second elementary.—Inorganic Chemistry: William Rich, first class, advanced stage, with laboratory practice; W. L. Chegwidden, and R. Tregiskis, second class advanced, with laboratory practice; Henry L. Passmore, and Foster Williams, second class advanced, W. L. Rowe, G. H. Richards, and J. H. Berringer, first class elementary, with laboratory practice; James Hocking, R. H. Patterson, and J. H. James, second class elementary.—Mining: Jas. Hocking, W. L. Chegwidden, R. Tregaskis, and Foster Williams, second class elementary stage.

ST. AGNES CLASS.—Mineralogy: Alfred T. Davies, first class, advanced stage; J. Hitchins, second class advanced; William Whitworth, first class, elementary; J. Harper, Fred. Davies, and W. Whitta, second class, elementary.—Inorganic Chemistry: Alfred T. Davies, first class, advanced stage with laboratory practice; Wm. Whitworth, second class advanced; J. Hitchins and Fred. Davies, first class, elementary stage with laboratory practice; Wm. Whitta, second class, elementary.—Mining: A. T. Davies, J. Hitchins, W. Whitworth, and Fred. Davies, second class, elementary.

HAYLE CLASS.—Steam: Jebus Bickle and Henry J. Warren, first class advanced; James Cox, first class, elementary; Thomas E. Bickle, William Hosking, Richard Veale, and Thomas Warren, second class, elementary.

PENZANCE CLASS.—Mineralogy: John W. Avery, E. W. G. Hosking, and Andrew Edwards, first class, elementary; John E. Drew, Richard Eva, and J. W. Berryman, second class, elementary.

PENDEEN CLASS.—Mineralogy: Henry Eddy, second class, elementary.—Inorganic Chemistry: Ephraim Noy, Andrew Angwin, Arthur Tippett, and Henry Eddy, first class, elementary, with laboratory practice.—Mining: W. H. White, A. Angwin, and W. H. Humphreys, second class, elementary.

ST. DAY CLASS.—Mineralogy: Fred. Bawden, first class advanced; John Phillips and George B. Luke, first class, elementary; J. Prout, Francis Luke, and C. Williams, second class, elementary.—Inorganic Chemistry: John Phillips, first class advanced, with laboratory practice; George B. Luke, second class advanced; Francis Luke and Samson Williams, second class, elementary, with laboratory practice; C. William and T. Prout, second class, elementary.

BREAGE CLASS.—Mining: R. H. Tregoning, second class advanced; J. C. Richards, second class, elementary.

CAMBORNE CLASS.—Mineralogy: Thomas H. Allen, second class advanced; Richard Peevis, second class, elementary.

ST. AUSTELL CLASS.—Mineralogy: H. Carveth and Thomas Henry Tresise, second class, elementary

THE ELEMENTS OF METALLURGY.

[FIRST NOTICE.]

It is but a few years since that the only work in the English language treating of the science of metallurgy was the "Manual," by JOHN ARTHUR PHILLIPS; but as his praiseworthy exertions as an Elève de l'Ecole des Mines de Paris, and his untiring researches during several years of subsequent practical experience had, even 22 years ago, rendered him thoroughly competent for the task he had undertaken, there was but little cause of regret that the field of English metallurgical literature remained for a long time otherwise entirely unoccupied; indeed, it may almost be considered to remain similarly unoccupied still, for although there have since been published Dr. Percy's elaborate volumes, and Messrs. Crookes and Röhrig's translation of Kerl's Metallurgy on the one hand, and the excellent little manuals on the Metallurgy of Iron, by Mr. H. Bauermann, and on that of Copper, Lead, and Silver, by Dr. R. H. Lamborn on the other hand, as well as Truran's treatise on the Metallurgy of Iron, Isaac Lowthian Bell on the Chemistry of the Blast-Furnace, and numerous admirable works which have been issued here and in America, there is not one which can be regarded as a substitute for the work of Phillips. The volumes of Dr. Percy are to a great extent a mere collection of materials put together in an undigested form; those of Crookes and Röhrig are better suited to the English metallurgist carrying on business in Germany; Truran's volume relates exclusively to iron, and even with the additions and emendations made by Phillips in the edition issued under his care, was not sufficently general to be equally useful in the several iron manufacturing districts of this country alone, whilst with regard to Bauermann's, Lamborn's, Greenwood's (only half finished), and others of the same class, they are at most but rudimentary treatises not fully adapted to the requirements of men practically engaged, or to be so engaged, in conducting the operations described.

Since his "Manual" first appeared Mr. Phillips has been constantly connected with metallurgical matters, and has thus obtained an amount of experience of which but one or two other writers on the subject can boast (and those in particular branches only), whilst the success he has achieved is a sufficient guarantee that his energies have not been misdirected. His extensive and varied experience has evidently been freely utilised in producing the very valuable volume* just issued, which has all the recommendations of the "Manual," with the additional advantage of bringing the information down to the present time, and embodying his own knowledge and estimates of the processes referred to. The professed object of the work in its present form is to supply within moderate limits such practical information upon general principles and typical processes as may not only afford a comprehensive view of the subject, but also enable the reader to study with advantage more elaborate treatises and original memoirs. This is precisely what the practical man requires; he must thoroughly understand the nature of the process he has to apply, and be competent to modify it to such an extent as to adapt it to the particular material under treatment. Mr. Phillips has aimed at and appears to have completely succeeded in giving information which will give his readers those qualifications, and the importance of them will be the better appreciated when it is considered that a given process, however good, is seldom applicable without some modification to several comparatively similar ores, and that the success or failure of a manipulation can usually be traced to his care or neglect to ascertain with the utmost precision the constituents of the material to be treated. To the neglect of this essential point may be attributed the failure of the numerous attempts to apply the wet process of extracting metals in Cornwall; to the opposite circumstance may be traced the brilliant success which has been obtained under the guidance of Mr. Phillips and his equally careful associates at Widnes.

The principle of division of the subject followed in the "Elements of Metallurgy" is such that the reader interested only in the metallurgy of a particular metal can readily obtain the information sought. By way of introduction, the Physical Properties of Metals are described, and Fuel, Refractory Materials for Furnaces and Crucibles, Iron, Cobalt, Nickel, Aluminium, Copper, tin, Antimony, Arsenic, Zinc, Mercury, Bismuth, Lead, Silver, Gold, and Platinum are subsequently treated of in separate chapters, and in the order named. Both the wet and dry methods of assaying are given with considerable detail, and when, as in the case of ironstones, the value of an ore is materially affected by the nature and quantity of the impurities present, the processes employed for their detection and estimation are fully described. The most reliable authors—English, American, and foreign—have been consulted, and the results of their researches have been embodied in the work, as well as the substance of notes which during more than 20 years have been made by the author in the course of his professional experience as a mining engineer and practical metallurgist, both at home and abroad, so that the value of the book is almost inestimable. There can be no question that the amount of time and labour expended on the book is enormous. With the metallurgy of many of the more important metals he is practically and minutely acquainted, and as he is still similarly occupied no fear need be entertained that even the most resently ascertained facts worthy of record would be omitted. The statistics, too, must have involved an infinite amount of trouble, and will, doubtless, be found reliable. Throughout the volume there are given many original, and apparently carefully executed, analyses, so that altogether it would be difficult to suggest in what particular the work could be improved, or how it could be rendered more useful to the class of students for whom it is intended. Phillips's "Manual" has long deservedly enjoyed a high reputation amongst metallurgical teachers and metallurgical students, and the "Elements,' which is to occupy the place of a new edition of the original book, which has been for some time out of print, will undoubtedly have an equally favourable reception, and retain for as long a time an enviable position amongst the metallurgical literature of English-speaking countries.

* "Elements of Metallurgy: a Practical Treatise on the Art of Extracting Metals from their Ores." By J. ARTHUR PHILLIPS, M. Inst. C.E., F.G.S., F.C.S., &c., Ancien Elève de l'Ecole des Mines de Paris. London: Charles Griffin and Co., Stationers' Hall-court.

THE CARDIGANSHIRE MINES—No. II.

To the west of the Crown Mine (with the mention of which the notice of Capt. Absalom Francis's pamphlet* in last week's Journal was concluded) is the East Llwynteify, having the River Rheidol for its western boundry. More than a century ago Mr. Morris reported that the Great Ystymtyhen vein, in crossing the Rheidol at this place, shows a rib of lead ore 6 in. wide, solid, with a considerable quantity of blende; he has no doubt of the value of the porperty. Llwynteify is on the west bank of the Rheidol, and has a mile on the run of the great Ystymtyhen and other veins. Taking the lodes, the extent of the grant, and the advantages for working the same, he considers it would be difficult to select another such property in any county, and that there is no doubt that if the present company succeed in raising the intended working capital, and apply it judiciously to the proper development of the veins in the grant, it will become a property second to none that has ever been laid open in the county. Further to the west are the Aberystwith mines, comprising Bwlchgwyn and Penrhiw Mines. They are now making very fair returns for a beginning, and as the mines are opened out and trial made, which can easily be accomplished by cross-cutting at different places, and at different levels, to the old Ystymtyhen lode, he has no doubt of their meeting with large quantities of paying ground.

Old Ystymtyhen is a very old and extensively wrought mine, and worked away from the surface by the old miners for a considerable length on the great Ystymtyhen vein, as deep as they were enabled to contend with the drawing of the water and stuff. The deep adit cross-cut is from 50 to 60 fms. above the bed of the Rheidol, so that the mine can only be termed at the present moment a mere surface trial, notwithstanding the very extensive workings done here. The component parts of the lode here are sulphuric mundic, blende, gossan, crystallised spar, and lead ore; and for 20 miles eastward, at the Van Mine, the vein is very much the same both in size and everything else, and there is but little doubt on Capt. Francis's mind that this vein traverses the Penrhiw, Bwlchgwyn, Llwynteify, the Crown, West Esgair Lle, near the Great West Van, then on to Aberdaunant, the Van Consols, then the Van, East Van, &c.; whilst westward, and adjoining this property, is the Tynyfron Mine, worked many years ago by means of an adit level driven in from the north bank of the Rheidol, but this adit reaches the lode at a comparatively shallow depth; the lode is large, and he had no doubt that if it be properly tried in depth good results would attend the trial. Gogerddan extends from the Tynyfron eastward as far west as to join the Caegynon boundry. It is well worthy of a spirited development, as it would unquestionably open out a good course of ore at the junction, and would also act as a sort of key to all the mines for some miles eastward. At Caegynon Mine the returns are now about 10 tons of lead and 40 tons of blende monthly, and he believes that if proper attention be paid to the western portion of the sett, and cross-cuts extended north from the lode to cut the lodes in South Bwadrain, Caegynon can yet be made a good paying concern. South Bwadrain, and Gelliveirin are favourably referred to. Looking at the Tyllwyd fairly, and with an impartial feeling, he will not be surprised if eventually the profits reach the very respectable figure or 10,000*l.* a year, or even more.

At Nant-yr-honen, 6 or 7 miles from Aberystwith toward Devil's Bridge, the lode is opened on for a considerable distance about 6 ft. wide, containing a fine gossan, blende, and lead ore, and a fair proportion of crystallised quartz. A greater depth on the course of the lode, however, is required before any great amount of profit can be realised, and this can be accomplished by driving in a deep adit level from the Cefn Nant-yr-honen, now held by the same company. When the machinery in course of erection shall have been completed—say, in 12 months—by using proper energy he looks forward with confidence to their commencing to pay an exceedingly good percentage on the sum invested. From Abernant he does not anticipate any very good results. He considers Aberffrwyd worthy of a fair trial. Gothic Mine has made fair returns, but not profits. At West Imperial, or Geifron, Mine the lode is from 9 to 12 ft. wide, with a fair proportion of lead ore throughout. The Rheidol lead mines, consisting at present of Llwybrllwynog, Gwaithcoch, Alltddu, and Erwtomedd, have been extensively worked. The scenery about these mines is magnificent. North Hafod is well deserving a spirited trial, and at no distant date it will undoubtedly claim the attention of some party who will be able to raise a sufficient sum (say, 5000*l.*) to develope the property fairly. At Bodcoll good machinery for pumping, crushing, and dressing has been erected, and they have opened out a mine which, if worked with energy both in laying open ground in length as well as depth on the lode, cannot fail to give lasting and substantial dividends. At West Bodcoll very little has been done. Llaneither will require about 10,000*l.* to erect the proper machinery and open out a sufficient quantity of ore ground to guarantee the payment of regular dividends. At De Broke, formerly Tygwyn, Mine he considers it will require greater depth to make the vein become paying. Greater depth is required both at Dolwen and East Dolwen before any profits will be realised.

East Hafod, on the north of the River Ystwith, has had a very rich bunch of ore worked over and under as deep as they could work without machinery. Capt. Francis is of opinion that if the course of ore found in the adit just referred to had been tried at a greater depth it would have led them into a good course of ore for some considerable length, and would open out in all probability a good paying mine. Pentre Brunant will, he thinks, with good machinery and management, open out lasting and profitable. Cwmystwith is still a very shallow mine, and will, he considers, when tried properly and in depth make as rich a property as it ever was, and a small amount of capital, energy, and judgment would soon achieve this very desirable object. Blaencwm and West Blaencwm he considers well worthy of trial. If a small sum of money (say, 10,000*l.*) were judiciously laid out at Craig-Coch, Cwmystwith, he thinks it could not fail to become a most valuable mine. At Pontrhyd-y-Groes a fine lode crops out at surface. Frongoch has been, and now is, the richest mine in the county, and has yielded immense profits. Blaencaenant is favourably mentioned. At Levelfawr very extensive and successful operations have been carried on. Glogfawr has also been extensively wrought. Grogwinion, or Brynystwith, will not, he thinks, fail in becoming one of the best mines in Cardiganshire. At Penlan he is inclined to believe a very great body of lead ore will be opened out. At Broncaradoc he considers that all that is now wanted is the erection of good and powerful machinery to sink the mine to a good depth, to draw the stuff, and to dress it by means of the most approved appliances.

In Llwynmalees Mine the lode is very large, probably from 30 to 40 ft. wide, composed of really a good gossan, not differing much in this respect from the gossan of Frongoch, a good crystallised quartz, and a good lode stone. During the past 30 years there have been considerable returns, but no profits. Esgairmwyn was most successfully worked about 120 years ago, and Capt. Francis thinks that any party embarking in the mine would undoubtedly reap a good harvest, but that it will require some time to fully lay open the ore ground, to sink the shaft to the required depth, and to erect the necessary machinery—say, three years—but when once accomplished the mine could not fail to give very large and regular dividends for the next half-century. Esgairdu Mine offers a good opportunity for the investment of capital. Cwm-mawr, belonging to the Lisburne Mines Company, has remained unworked up to the present time, he presumes as a sort of nest egg when required. At South Lisburne the lode is of good size, being about 12 ft. wide, and carrying a rich unmistakeable gossan at surface, which alone is a sufficient guarantee in this county of its continuing very productive in depth. Rhysgog Mine requires a capital of (say) 10,000*l.* for the erection of a good lot of machinery for pumping, crushing, and dressing, and the proper laying open of the ore ground at a greater depth, and to a greater extent lengthwise; he fully believes that then no mine which has been worked in that district would surpass it in richness or durability. At Brongwyn a very fine lode, rich in silver, was discovered and laid open at surface. At Llanfair he estimates that the old hillocks, or waste heaps, and the stuff broken and lying in the mine will yield when properly dressed 10,000*l.* profit. The returns made from the property may be estimated at about 80,000*l.* worth of lead and 1,000,000 ozs. of silver.

Whenever the Fachddu property shall have a fair trial, Captain Francis has no doubt whatever that it will prove as productive as the Llanfair Mine has turned out to be, and with a good field of machinery it will reap the advantages of cheap dressing, crushing, and drawing from its starting from the adit level; whereas at Llanfair all the water and stuff had to be drawn by hand-power, as well as the ore crushed by hands by small bucking hammers. At Gwaithvach 3000*l.* judiciously expended on the best dressing machinery—stone-breaker, with a powerful wheel and crusher—the mine would, he thinks, soon be brought into a condition to pay cent. per cent. upon that capital. Esgairgadfach is another of the Llanddewibrefi series, and if taken in hand by a spirited company a small capital could not fail to make it pay an extremely good percentage on what it requires. At Brefi several very fine lodes have been found, producing both good lead and copper ores of a very rich quality.

Although but the briefest outline of Capt. Francis's pamphlet has here been given, it will suffice to permit of an opinion being formed as to its merits. To those desirous of visiting the mines themselves the pamphlet will form a valuable guide-book, whilst the benefit which will result from the additional attention which will be directed to the mines of Cardiganshire will more than compensate for the slightly adverse views which he has expressed concerning the prospects of certain properties which have not yet been thoroughly developed.

* "History of the Cardiganshire Mines from the Earliest Ages to A.D. 1874, with their Present Position and Prospects" By ABSALOM FRANCIS, Mining Agent, Engineer, and Surveyor. Aberystwith: Morgan, Pier-street; and London, at the *Mining Journal* Office, 26, Fleet-street. Price 2s. 6d.

FOREIGN MINING AND METALLURGY.

The Belgian iron trade is still extremely quiet. The quietness which prevails may be said, indeed, to border on depression. The works are pretty well employed it is true, but heavy orders calculated to ensure the future still make default, and if prices remain firm this arises from the state of the coal trade, and the hope of a revival in affairs, which cannot fail to manifest itself, it is thought, after a long period of stagnation. Luxembourg pig having advanced 10d. to 1s. 8d. per ton, the proprietors of Belgian blast-furnaces are now enabled to compete with their redoubtable opponents in the Grand Duchy. Casting pig, No. 5, has been quoted at 4*l.* 4s. per ton, refining pig of good quality at 3*l.* 6s. to 3*l.* 6s. 6d. per ton, and ordinary refining pig at 3*l.* 3s. 6d. to 3*l.* 4s. per ton. Merchants' iron and plates remain without variation; the first is firmly maintained at 8*l.* to 8*l.* 4s. per ton. It is thought that the demand for pig and iron must increase in Belgium. Railway companies, ironfounders, manufacturers of plant and engines, blacksmiths, and even iron merchants have all for some time past held only very limited stocks of iron, and when there is a general impression that a further fall has been checked for the season all such parties as those enumerated will, it is expected, present themselves as purchasers in the market. The direction of the Finland Railways—Alleo to Tammersfors and Tavastehus—is about to let contracts for 15,700 tons of rails with accessories. The new Terre Noire process for the manufacture of steel by the use of ferro-manganese is about to be tried in three of the Belgian works.

There has been a continued improvement in copper at Paris. Chilian copper in bars has been quoted at 85*l.*; ditto, ordinary descriptions, 83*l.*; ditto in ingots, 89*l.* per ton. English tough cake has made 88*l.*, and pure Corocoro minerals 85*l.* per ton at Paris. There has been little doing in Chilian copper at Havre; quotations have followed nominally those of the English markets. The aspect of the German copper markets has scarcely changed; transactions have been confined almost exclusively to the requirements of consumption; prices have been generally, however, maintained with firmness. Tin has slightly fallen at Paris; Banca, delivered at Havre or Paris, has made 109*l.*; Straits ditto, 107*l.*; and English, delivered at Havre or Rouen, 106*l.* per ton. The Marseilles tin market has remained without business, but prices have been pretty well sustained. Tin has been tolerably firm upon the Rotterdam markets; some transactions have taken place in Banca, at from 60 fls. to 62½ fls., but sellers have become somewhat scarce. Billiton has been dealt in at from 57½ fls. to 58 fls. The demand for tin upon consumptive account has, upon the whole, remained active at Rotterdam. The German tin markets have exhibited generally no great amount of animation. Lead has sustained itself without much change at Paris. At Marseilles lead has been rather sought after, but at the same time prices have not varied materially. Business in tin has not been very active in Germany, but prices have been maintained. There has been a little feebleness in the zinc market; Silesian, delivered at Havre, has made 23*l.* 4s.; other good marks, delivered at Havre, 22*l.* 16s.; and ditto at Paris, 23*l.* per ton. The German zinc markets have not been very active, but firmness has predominated.

Some of the Russian papers state that the rapidly increasing demand for heavy iron manufactures, such as locomotive and other steam-engines, railway carriages and trucks, and iron rails for the use of the already existing and projected railways both at home and in Central Asia, has stimulated this branch of industry in Russia to an extent which cannot fail to exercise the most beneficial influence upon national prosperity. There are now in Russia several iron foundries where iron rails of excellent quality are manufactured by thousands. At the iron foundry at Khartsiz on the Kursk-Charkoff-Azoff Railway during the month of March last 36,000 poods of cast-iron were manufactured, 4570 pieces of rails weighing 48,000 poods were made, and 50,000 poods of iron were prepared for the use of rails. Total, 134,000 poods, or about 2392 tons 17 cwts. English. On April 20 last 30,000 poods of rails were delivered for the use of the new Sebastopol Railway.

Prices have slightly hardened in the French iron trade. Orders have become rather more numerous and more sustained. It is now generally supposed that French metallurgical industry will rally rather more promptly than had been expected from the prostration into which it had fallen. At the same time, it will not do to indulge in illusions in regard to the state of metallurgical affairs, as a sudden revolution can scarcely be anticipated; we must rather be contented, probably, with small assured profits, instead of speculative and unusual realisations. It is announced from St. Dizier that charcoal-made pig, for refining, is maintained at 5*l.* to 5*l.* 4s. per ton, while coke-made iron has brought 8*l.* 12s. to 8*l.* 16s. per ton. In the Meurthe-et-Moselle group refining pig is worth 3*l.* to 3*l.* 1s. 8d. per ton. The importations of iron and plates into France in the first five months of this year, as compared with the corresponding period of 1873, have not sensibly varied. The exports generally are similar to those of 1873, although a slight improvement may be noted in favour of the present year.

There has been no material change in the French coal trade. There

has been, perhaps, a little feebleness in the South, but otherwise there has been no variation to note in quotations. The closing of navigations incident to this season is not expected to be attended with any serious consequences. The supplies required for Paris are assured, as well as those of the principal works. During the enforced suspension of the navigations stocks will have to re-form themselves, so that unless a rapid and unforeseen stimulus should be communicated to industrial pursuits the state of affairs will probably be found on the re-opening of the navigations very much what it is at present. An advance in coal prices does not appear probable in Belgium, as the working miners are accepting, without complaints, the reductions in wages proposed to them. On the other hand, a reduction in coal rates is not likely, as the requirements of industry and commerce are sufficient to guarantee the eventual sale of all the coal raised in the North of France, as well as in Belgium. The Vendin-lez-Bethune Colliery Company will pay a dividend of 1*l.* 12s. per share for 1873. The Bouches-du-Rhône Collieries Company will pay, on July 1, a dividend of 16s. per share for 1873. The dividend of the Malfidano Mines Company for 1873-4 has been fixed at 2*l.* 12s. per share.

The Belgian Coal Trade has presented rather an improved appearance. Present rates must be pronounced sufficiently remunerative for colliery proprietors, while existing quotations are also supported with firmness. Contracts at current rates are stated to have been now concluded with industrials for deliveries which will continue until the close of the year. The existing stability of prices is inducing consumers to give out orders more freely than they would probably otherwise do. The Belgian General Gas Company has just concluded contracts for coal to the extent of upwards of 30,000 tons, at 13s. 8d. per ton, for the supply of its Belgian works and part of its French works. Similar descriptions of coal were quoted at 24s. per ton some months since. Upon the whole, the general state of affairs is not bad, and if the heavy, not to say enormous, profits of the past are still regretted by some insatiable colliery proprietors, the existing condition of things in which coalowners live and let live is much to be preferred. A slight advance upon present rates would probably have the effect of inundating Belgium with English and Westphalian coal. The Charleroi Canal will be closed in a few days, and there has been some activity in consequence in that district.

Meetings of Public Companies.

THE FLAGSTAFF SILVER MINING COMPANY OF UTAH.

An extraordinary general meeting of shareholders was held at the Cannon-street Hotel, on Wednesday, for the purpose of reporting to the shareholders the progress that had been made with regard to the negociations with Mr. Davis, and the desirability of carrying out the proceedings determined on by the majority of the board, as recommended by counsel,—Mr. T. TWEED in the chair.

Mr. J. RENDALL GOLE (secretary) read the notice convening the meeting.

The CHAIRMAN said he had been appointed Chairman of this company in consequence of Mr. White, the previous Chairman, having resigned. Perhaps he had better read the letter which Mr. White had forwarded to the board in connection with the matter. The letter stated that after giving mature consideration to what had passed at the last meeting, and the directors acting in direct opposition to his views as to what he considered the true policy of the company, Mr. White felt there was no alternative but to resign. Shareholders would see by that letter that there was a kind of—he would not say disunion—difference of opinion as to the policy which should be pursued. Since the present board had been in office they had had but one object in view, and that was solely to advance the interest of the company, and they had deemed it advisable the moment the slightest difference of opinion occurred to come before the shareholders, and tell them what that difference of opinion was. The resolution at the last meeting was that the directors should take such proceedings against the late directors and Mr. Davis as deemed advisable, or to enter into such compromises as may be for the true interest of the company. With that view, and believing in the advisability of a friendly compromise, they at once put themselves in communication with Mr. Davis; two of his co-directors—Mr. Mackenzie and Mr. Woodfield—went over to Paris to see Mr. Davis, that gentleman having left for Paris almost immediately after the meeting. Mr. Davis said he could only receive Messrs. Mackenzie and Woodfield as individual shareholders, because he could enter into no negociations with the board until one of its members had apologised or resigned. Having no interest but that of the company, those gentlemen returned. The board conferred with Mr. Burnand when that gentleman resigned. Believing that Mr. Davis was actuated by the feelings of a gentleman, the board at once again put themselves in communication with Mr. Davis, informing him that Mr. Burnand had resigned; they then thought there could not be any possibility of obstacle between Mr. Davis and the directors. Mr. Davis wrote to Mr. White, as the Chairman of the company, asking him to come to Paris, as there was no longer any obstacle in the way of compromise. But it was found that Mr. Davis's terms were more exorbitant than ever—the debts in London were 5000*l.*, in Utah 11,000*l.*, and the ore contracts 55,000*l.*, or upwards of 70,000*l.*; besides this amount Mr. Davis said he must have interest at the rate of 5 per cent., and would not listen to any other terms. The company had no power to borrow more than 10,000*l.*, and Mr. Davis had no legal claim beyond that amount against the company; but he asks—by way of compromise—to give him every shilling which he could by any possibility make up, without giving any accounts to test the correctness of the items. Of course, they could not agree to such terms. He believed Mr. White would have compromised the matter for 50,000*l.*; and seeing the anxiety of this gentleman, and his determination to have his "pound of flesh," if the directors differed with Mr. White, they thought it advisable to sanction such a state of things. That is the history of this matter. The directors had done everything to compromise it, but Mr. Davis was in Paris, and determined to come to no compromise at all. Mr. Davis says the mine is a good one, paying its way, and by degrees paying him off. They said to Mr. Davis, let him take his debt at a certain amount of money, and let him keep possession of the mine for the purpose of paying himself off, but to divide the profits equally between himself and the shareholders. It struck him (the Chairman) that would be a fair proposition. He believed Mr. White was still anxious to compromise the matter, and had asked Mr. Davis to fix a date when he would give up the mine, but Mr. White did not make that proposition to him. The directors, however, had written to Mr. Davis asking him if he were paid off in October whether he would be ready to give up the mine on Nov. 1. No reply had been received to that letter; and, finding it utterly impossible to come to any kind of arrangement with Mr. Davis, the directors had called this meeting to ask the approval of the shareholders to file a bill in Chancery against the late directors and Mr. Davis, for the purpose of obtaining an injunction preventing Mr. Davis receiving any further money from the mine, and to get a receiver appointed who should at once proceed against Mr. Davis for an account of his claim. That course the directors considered to be just and right for the shareholders, and at the same time in the true interest of the company. The resolution suggested was that the board be authorised to take such steps as counsel may advise, but that the directors have still authority to enter into any compromise they may deem best for the true interest of the company.

Mr. UPPLEBY, as the holder of 250 shares, which had cost him 2500*l.*, begged to propose that resolution. As a lawyer he was strongly of opinion they had a good remedy against the late directors for having entered into nefarious contracts with Mr. Davis, the directors having no power to borrow more than 10,000*l.*, and by which the dividends had been increased for—he was afraid—nefarious purposes.

Mr. T. G. TAYLOR: Will the solicitor point out in what way they could deal with Mr. Davis?

The CHAIRMAN: The board have the opinion of counsel—Mr. Higgins—in which he very clearly points out the line they ought to take.

A SHAREHOLDER: What is the opinion of counsel?——The CHAIRMAN: I think it is not advisable or desirable to state it at present.

Mr. TAYLOR: You cannot expect from the late directors the whole of the shareholders' claim. I think our claim will extend beyond 70,000*l.*, because we have a right to have the mine re-instated in a proper position. What means had they of bringing Mr. Davis to book?

The CHAIRMAN: The contract was made in England; therefore Mr. Davis would be amenable to the laws of this country.

Serjeant SLEIGH: Suppose you get judgment, and Mr. Davis has no property in this country; what advantage can you get by it?

The CHAIRMAN: There must be a law in America, as well as here.

A SHAREHOLDER: I represent a number of country shareholders, and under my advice they sent to Utah to get information about the mine, but all they could get was "The mine promises well." What is the total amount of Mr. Davis's claims?

The CHAIRMAN: We do not admit his claim.

A SHAREHOLDER: What does Mr. White propose you should do?

The CHAIRMAN: The other directors thought a bill in Chancery should be filed against the late directors and Mr. Davis. Mr. White, on the contrary, wishes no proceedings whatever to be taken against Mr. Davis. It appears that negociations are still going on, although anything like a prospect seems as remote as ever.

Col. CHURCH: I am an original shareholder. It appears the policy the board proposes to pursue is the most ludicrous ever known. We want to get possession of the mine and to work it. I believe it to be one of the most valuable mines in the United States, and to file a bill in Chancery against the late directors or Mr. Davis appears to me to be equal with a Pope's bull. It was worse than a mortgage of the mine—Davis could actually foreclose for the amount owing to him, and be in possession of the mine within 30 days. I happened to be in Paris the day before yesterday, when I called upon Mr. Davis. Mr. Davis, I think, talks fairly, he says if the present board uphold the agreement entered into with him there would be no difficulty in arranging for turning over the mine. Since Mr. Davis took possession of the mine it has paid more than in the whole of the previous year. The mine is developing well, and Mr. Davis has built another furnace. It appears that under Mr. Davis's management the mine is gaining ground, and paying off its debts. Mr. Davis will turn over the mine if he has returned to him the money he actually advanced to the company.

The CHAIRMAN: Mr. Davis received of the first dividend of 6000*l.* no less than 4381*l.*; of the second, 3882*l.*; of the third, 3382*l.*; of the fourth, 3041*l.*; and of the fifth, 2781*l.*

Colonel CHURCH: It seems to me if he was a stockholder to that extent he had a perfect right to the dividends.

Mr. UPPLEBY: It is very clear Mr. Davis advanced money so as to declare dividends, and advance the price of the shares, when he sold his own.

Mr. GARNE seconded the proposition. He did so because he understood the late directors had acted illegally, and because, therefore, Mr. Davis had illegal possession of the mine. Surely, if such were the case there must be some remedy in America.

Sergeant SLEIGH said the question was whether the advance had been made by Mr. Davis for the purposes of dividend, or for the purchase of ore to be delivered. He wished to know whether the contracts between Mr. Davis and the company for the advance of money were in writing or not? If they were, the writing must be produced.——The CHAIRMAN said the contracts were in writing, but it was the first time he had ever heard that contracts made by a board of directors should be produced at a public meeting. The board had been advised by most eminent council that those contracts are illegal.

Mr. T. G. TAYLOR understood there was a gentleman present who could throw a great deal of light upon the matter—he referred to Mr. MAXWELL. He (Mr. Taylor) thought it would be unwise to come to any conclusion without hearing what Mr. Maxwell had to say.

A SHARHOLDER asked what transactions the board had had with Mr. Davis, and what were the nature of the communications between them?——The CHAIRMAN said if he was to go through the whole of them he should keep the meeting for a month.

Serjeant SLEIGH said it so happened that when in Paris, since the last meeting, he called as a shareholder upon Mr. Davis, and he was bound to say that the impression left upon his mind was such that he was thoroughly astounded when he received the notice by which this meeting was convened, because he certainly gathered that Mr. Davis was perfectly prepared to enter into an equitable arrangement with the directors; but he also gathered that there were certain difficulties in the way, because one gentleman had called Mr. Davis a thief, and another said he was an angel. (Laughter.) He thought it was much to be regretted such a proposition as that now before the meeting should be carried while there was the slightest hope of negociation; he deeply regretted the secession from the board of Mr. White, its chairman, than whom there could be no more honourable man; and he ventured to think that if those negociations had been prolonged this matter might have been brought to an issue without resorting to means the result of which usually was that the lawyers got the oyster and the shareholders the shells. Therefore, he ventured to suggest that another effort should be made to prevent anything like war *à l'outrance*, and he would propose as an amendment that this meeting requests Mr. Henry White to withdraw his resignation, and that an adjournment should take place for a fortnight for the purpose of seeing whether Mr. White complies with the request or not. The Chairman had made reference to a letter in which Mr. Davis said he would be happy to see Mr. White in this matter. Would the Chairman produce that letter, in which Mr. Davis said if Mr White would come to Paris, accompanied by him (Serjeant Sleigh) the whole thing might be brought to a conclusion within an hour? Would the Chairman produce that letter?

The CHAIRMAN: Mr. White has it.

Sergeant SLEIGH: Then I am not contradicted in the fact.

Mr. GREENFIELD seconded the amendment, and suggested that the following words should be added, "Inasmuch as the the meeting in its present state of information is not prepared to carry out the resolution."

Mr. STAPLES said, as a friend of Mr. Davis, but as a shareholder, he thought some further information should be given to the shareholders. He had lost a great deal of money, as he held shares at a very high price. He knew very well if they went into litigation they would only get the shells. The value of good management had been seen by the fact that from Jan. 14 to March 31 of the present year there had been ore sold to the value of $188,000, at a cost of $121,000, or a net profit of something like 14,000*l.* That had been done with the furnaces in a deplorable condition, and in midwinter, with bad roads. If this result could be obtained in winter, and by a lower grade of ore, he wanted to know why those dividends were not legitimately paid? When Mr. Davis entered into that arrangement there were several suits, which he had cleared away, and the property was heavily in debt. Mr. Davis found the money to pay off all claims, and got possession of the mine, which he (Mr. Staples) considered fair and equitable. The debts in Utah were 40,000*l.*, and Mr. Davis had spent 6000*l.* in new furnaces, doubling the former capacity, but the present debts were—in London, 5000*l.*; in Utah, 5000*l.* Mr. Davis does not want to retain the property, he merely wants his money back. Mr. Davis had written a letter to Mr. White, who had authorised him to make what use of it he (Mr. Staples) chose. He could not read it, because it was a private communication, but he would state the fact. It was that Mr. Davis would give up possession as soon as he had paid himself—in a right and proper manner—the ore to which he was entitled, or he would arrange to accept its equivalent. According to recent indications, in four months from now Mr. Davis would be paid off. In the meantime, if the shareholders would have to wait too long for dividends, Mr. Davis was prepared to pay them 6 per cent. out of the profits. The mine was being opened out fairly and properly, and not having its "eyes picked out." Mr. Davis's ambition was to show that this mine was a valuable property, and he wished to give it up as a valuable property. Were the shareholders under such circumstances going to allow this board to take it into Chancery? He wanted to know how it was that Mr. Snell, the solicitor, had now so magnanimously come to the fore? Mr. Snell first appeared in Flagstaff, then in Last Chance and Tecoma, and again in Emma, constantly turning up litigation everywhere.——Mr. SNELL: That's untrue, because I have nothing to do with Last Chance.

Mr. STAPLES: No; and simply because the shareholders decided to continue the arrangement. And somebody here whispers Camp Floyd. He (Mr. Staples) wanted the property protected, and it was for the shareholders—not the lawyers—to say whether they would go to law.

Mr. GARDE said all that Mr. Staples had said was a mere statement. He did not know the shareholders were antagonistic to Mr. Davis, and he understood that Mr. Staples was Mr. Davis's broker, and, it may be, the holder of Mr. Davis's shares.

A SHAREHOLDER said he was a particular friend of Mr. Davis, and was glad to find that Mr. Staples had had the courage to defend an absent gentleman. He did think it was hardly fair to have but one side of this story and not the other. Mr. Davis does not wish for litigation. A statement had been made that Mr. Davis left this city after the last meeting; on the contrary, Mr. Davis left before the meeting.

A SHAREHOLDER said that the board told them the door was absolutely closed to any arrangement, but Serjeant Sleigh told them it was not absolutely closed.

Serjeant SLEIGH said he was assured it was not closed. The question was one of policy. Mr. Davis advanced this money knowing it was to be paid in dividends, which had not been earned. They knew the collateral circumstances, and of the introduction of the Tecoma Mine, but the simple question was whether as a matter of policy they should endeavour to induce Mr. White to step in and try to make a friendly arrangement?

The CHAIRMAN said there was a perfectly cordial and good feeling between the directors and Mr. White, and so far as they were concerned they would be most happy to see him back and take his seat. But they had just got into this position—no stone had been left unturned to bring about an arrangement, but without any satisfactory result. They had always heard from Mr. Davis's friends that he was a man easily treated with, and upon that the board had traded, but Mr. Davis would not come to any such arrangement. It had been said the board wished to go to law. The best reply to that statement was to put another question—had they filed a bill in Chancery, which they were empowered to do on April 16—had they taken a single step against Mr. Davis, of which he or his friends could complain? Who had taunted the board that they wished for litigation? He had heard Mr. Staples's grand flourish about the mine—if this mine were so good whose fault was it that it was in its present position? He was constrained to say that he pitied the late directors, who were led into it by Mr. Erwin Davis, who sold it for 300,000*l.* Let not the shareholders be led away by the apparent zeal of Mr. Staples, who was Mr. Davis's broker. It was easy to throw odium upon Mr. Snell, but he (the Chairman) knew whom he would chose of the two. If there be anything in what Serjeant Sleigh had said about his interview with Mr. Davis, was Serjeant Sleigh prepared to pledge his honour and his word that an equitable compromise could be effected? He (the Chairman) would never believe it till he saw it in black and white. And why? Because he had sat at this board three months, and notwithstanding every attempt had been unable to get any hold upon him. Mr. Davis wanted them to confirm these illegal contracts and make them legal, which he would never do. (Hear, hear.) The directors wanted no litigation, but they did want this matter settled. They had no objection to the amendment, except that which involved the interest of the company.

Serjeant SLEIGH said he knew no more of Mr. Davis than any stranger in the room. It was at the request of the Chairman that he saw Mr. Davis, and how on earth he could be expected to pledge Mr. Davis to any course he could not imagine.

Mr. WOODFIELD (a director) said some of Mr Staples's figures were correct, but some he could not check, because Mr. Staples had had them from Mr. Davis. From the beginning Mr. Davis had told them he had the whip-hand of them, and would keep them in subjection. If he thought there was any chance of ever getting the mine out of Mr. Davis's hands he would do anything rather than go to law, but he must confess he saw no chance. He was sorry to say that from the accounts furnished to the board by Mr. Davis—represented by a mass of papers and vouchers—he (Mr. Woodfield) had very little faith in the present management of the mine. The vouchers had passed into the hands of their accountant, who had given them great attention, and his report confirmed his (Mr. Woodfield's) opinion on the subject. Mr. Davis had made a large expenditure upon the Last Chance Mine which had been debited to Flagstaff, and the debt had been increased upon Last Chance by $47,000; no doubt the same remarks apply to Tecoma. If Flagstaff made profits, and they went to work on Last Chance or Tecoma, there was very little chance of getting it out of Mr. Davis's hands. He had been informed that the haulage could be done at $5½ and $6 per ton, but Mr. Patrick had made a contract to pay his own brother $8 per ton; and Mr. Patrick was incurring great expense in the use of his brother's teams while the company's mules had been sent out to grass at great expense to the company. He cordially gave his support to the proposition.

A question arose as to whether Mr. Maxwell should be heard before or after the business of the meeting had been disposed of. It was decided that the amendment should be put, upon which 33 hands were held up in its favour.——The CHAIRMAN declared it carried, and the resolution negatived.

Mr. MAXWELL stated that as the other gentleman had made various reflections on past and present management, he considered that, as Englishmen, the stockholders should hear what he had got to say in reply. After some further interruptions, Mr. Maxwell stated that he took charge of the mine about the middle of June, 1872, and there had been no profit made since January; there was then a debt of over $50,000 due upon the mine, which was cleared off, and $4000 remitted to London in the month of August, 6000*l.* in the month of September, 8000*l.* in the month of October, 8000*l.* in the month of November, and 7500*l.* in the month of December. At this time workings were suspended in consequence of the snow slides and the horse disease. The London office was advised of these facts by cable, and the suggestion made that dividends should be suspended for a period. I was, however, instructed to haul ore at any cost, and accordingly did so, and kept the furnaces running until April, though at no profit, in consequence of the heavy expenses and fixed charges, and the small produce of bullion. At the end of the year, in addition to the large remittances to London, the reserves of ore in the mine had been increased from 5500 tons to 18,000 tons, and whatever notions the gentleman may have about management, I consider this to be a very good result of mining operations. These facts ought to prove very fairly the value of the mine. In April, 1873, Mr. Forbes arrived with full powers of attorney, and I was entrusted to increase the yield of the mine to 100 tons per day. This I considered very bad policy, and so expressed myself, for the reason that in the necessarily limited space in the workings it would be impossible to select carefully the ore sent away, and separate the ore from the low-grade gangue matter, thus having to pay the full rate of carriage to market on the latter, which should not leave the mine without being dressed to a sufficient richness to bear carriage. For this, and other reasons with which all who are acquainted with mining operations well know, I considered that the mine would be unfairly worked, and I tendered my resignation, to take effect on Nov. 8, 1873, and repudiated any responsibility in the matter. In October, 1873, the company was nearly clear of debt in Utah, when the financial panic broke out, and thereby a loss of some $30,000 was incurred by the company on their sales of bullion. About this time, also, Mr. Patrick was desirous of being paid the amount of $25,000, and likewise the interest on some orders which had been issued from the London office in February and March of 1872. Capt. Forbes's term of office being up on Nov. 16, 1873, I was pressed by the present superintendent and cable communications to London to remain with the company after his departure, which I consented to do, believing fully that I would be able to get the mine into a dividend-paying state again by about the end of March, 1874, in addition to completing the ore contracts so far as I understood the company's obligations to extend—to delivering the ore at the ore house, the buyer to sack it, and take it away from there at his own cost and risk, and these views I communicated to the London office. Capt. Forbes attached the mine for the debt due to him, and I cabled to London for assistance, and at the time I was receiving cables from the company that the remittance would be made without fail, and be sure to arrive on a certain Tuesday morning. They were at the same time making arrangements to hand over all the properties, and on the Tuesday morning I received a cable to hand over everything, including all the books, &c., which I did. As far as accounts are concerned, Mr. de Metz, the chief accountant of the company brought out with him all the vouchers, which had hitherto been sent over to London, and compared the books with them and the vouchers which had subsequently arisen. This gentleman made a most careful examination of the books, at which he had been occupied nearly three months at the time he was requested to hand them over to Mr. Patrick. Mr. de Metz is here present, I observe. I addressed a circular to the shareholders from San Francisco, and upon my arrival in this country, in April last, I wrote to the secretary, and told him of my arrival in London. I have several times since waited at the office, but have not been honoured with an interview by the directors. I have had no opportunity of making any statement to the shareholders respecting my management of their affairs, and I am voluntarily here to-day with the sole object of answering any questions they may have to put, and giving them all the information I can in respect of their property.

Several questions were then asked, and replied to by Mr. MAXWELL.

A SHAREHOLDER asked Mr. Maxwell where the 3000 tons of ore in Tecoma was?

Mr. MAXWELL stated that this quantity of ore was there without doubt, but that its quality so far had not reached the value which was at one time anticipated that it would. He had heard from Utah that the furnaces had again started, and he was hopeful that good results would follow.——The meeting then adjourned.

GOLD MINING COMPANY OF YUBA.

The fifth ordinary general meeting of shareholders was held at the London Tavern, Bishopsgate, on Monday—

Mr. H. E. ORMEROD in the chair.

Mr. T. STEVENS (the secretary) read the notice convening the meeting, but as there was not a quorum the special business could not be proceeded with. The object of the special meeting was—to consider, and if deemed advisable, to authorise the transfer of the shares numbered 11,676 to 16,675 inclusive, although no dividend in respect of the share capital of the company may have been first paid in accordance with the terms of a contract, and made between Edward Bishop, M.D., and the company; to consider, and if deemed advisable, to authorise the directors to raise further capital by the issue of debentures or otherwise, upon such terms as to the said meeting may seem fit; and to discuss generally the financial position and prospects of the company, and pass resolutions in regard thereto. Subjoined is the directors' report:—

The annual meeting of the shareholders of this company affords the directors the opportunity of reiterating their belief in the value of their property in Idaho, and, if sufficient working capital can be provided, of the success of their operations. The directors, who hold a large interest in the capital of the company, and who have paid the most unremitting attention to its affairs, feel equally with their brother shareholders the length of time which has elapsed since operations were commenced, and the small result hitherto obtained from the mines, but in a communication received from Mr. Mattingly he still considers that with a little further outlay success is certain, and it must not be lost sight of that his interest in the mines is so large there is every guarantee he will do his utmost to insure it; and, further, that until he brings the mine into a dividend-paying condition he receives no salary whatever, such being the agreement made with him when the mine was purchased, and which has been strictly carried out. Referring to the history of almost every mining operation, either at home or abroad, there appears to be a mistake invariably made as to the amount of capital required for working purposes, and it is on this account principally, even where a property is intrinsically good, that so many mining operations are doomed to delay, and even failure. This mistake has been made in our case, and the directors feel that the responsibility rests with Mr. Mattingly, who assured them the sum originally named by him would be sufficient. On the other hand, it would be unfair to him not to bear in mine that when a serious delay occurred in the development of the Stanley Mine, and there appeared to be some doubt as to the proper direction in which to find the lode again, Mr. Mattingly came forward and gave the company 640 ft. in another mine—the Leonora—which is admitted to be one of the most promising in the territory; and further than this, on a recent occasion when asked by the directors if he would give up 1000 vendors' shares to enable them to raise funds he did so without hesitation.

Notwithstanding these facts, and the belief by the directors in the *bonâ fides* of Mr. Mattingly, they do not wish to hide from the shareholders the opinion they have formed that he is not the best man they could have to superintend the reduction of the ores found in the Leonora and Stanley Mines, and that if a sufficiency of funds were at their disposal they would make other arrangements; indeed Mr. Mattingly himself some time ago suggested this in consequence of the remonstrances of the directors at the long delay that was taking place in bringing his operations to the promised successful issue. There is ample reason for the belief that by raising at the present time a little more capital the long-desired results of dividends will be obtained, but the general want of confidence in American mines has been, and still is, so great that the directors find the utmost difficulty in obtaining money even on the most tempting terms. Applications have been made in several quarters for a loan to aid this company, and two are still pending, by which it is hoped assistance may be obtained, and for this purpose, and the completion of the arrangements with the debenture-holders, the vendors shares, which were held in London by agreement until dividends were paid, should be set free, as it is impossible to obtain assistance in any quarter without giving a bonus in the shares of the company, and to do this it will be necessary for Mr. Mattingly to surrender some portion of the 5000 shares retained by the board.

It is quite useless to restate that the directors are satisfied as to the value of the company's property, but they wish it to be known that several circumstances have occurred within the last twelve months to increase this value, altogether independent of the developments effected under their manager's superintendence. One of the most important of these is the energetic manner in which the people of Idaho and Oregon are prosecuting their railway project for making a line of road connecting Portland with the Union Pacific at Ogden, which will pass within about 35 miles of Yuba, going through the centre of the territory of Idaho. This road will more than double the value of all real estate in Central Idaho, and more than quadruple the value of mineral properties in the South Yuba district, where this company's mines are situate. The great drawback to the working of the Idaho Mines is the difficulty of transit for food and materials, and the consequent high price of labour; but all this will be changed as soon as the Portland Dalles and Salt Lake Railroad is completed. Failing the success of the directors in obtaining a loan, or in getting subscriptions for debentures from the public, they will be compelled again to appeal to the shareholders to supply the required funds. They have themselves already subscribed considerable sums, and induced their friends to do the same, and they will have great reluctance in applying to them again; but as they have so large a stake in the property they will be serving their own interests, as well as doing their duty, in leaving nothing undone by which the success of the company may be effected, and they trust they will have the cordial and active support of the shareholders in their endeavours to secure this result.

The CHAIRMAN stated that the meeting had been convened to receive the report and balance-sheet, and also to transact certain special business, and it was in consequence of that that the meeting was called a month earlier than it otherwise would have been. As they had waited more than the half hour and still they had not the ten shareholders required to form a quorum, the meeting would, in accordance with the company's Articles of Association, be adjourned until the following day at the same time and place, and if there was not then a quorum the meeting would be dissolved. There was nothing, however, to prevent them from doing the ordinary business so far as to receive the directors' report and pass the accounts. Having read them the report he had but a few observations to make. Their difficulty had always been insufficiency of capital, but they started upon a different basis to other similar companies; indeed, they had gone upon the opposite principle. They determined that they would buy their property cheaply, and that they would buy chiefly for

shares, thus making the payment to the vendor dependent upon success. In their case, moreover, the vendor had managed the property and had received no salary whatever. Many of the shareholders, especially those who attended the meetings, had done much in the way of providing capital, but those absent had done but little. The directors could only place before the meeting the facts, and the question which the shareholders naturally asked was—How much money would be of any service to them? Some of their estimates had been exceeded, but they had not been supported to the extent they asked when making them. It was useless for them to expect to be in a strong financial position until the mine produces dividends. If they could keep the mine in a going condition until they were able to pay dividends, they would not require much money from the shareholders. Looking at it otherwise, they had endeavoured to obtain a loan, and had been to one of the joint stock companies, and placed their case before them. The answer was that they could do nothing without a fresh report. They learnt in one quarter that there was an opportunity offered of employing the services of a skilled man who happened to be engaged upon other business in the neighbourhood. They would have to pay the expenses, but could not obtain a definite promise that if the report were favourable a fixed sum should be advanced. He thought it was worth incurring the expense. He thought also that they could keep the company alive, obtain the report, and go on for a year with from 150*l.* to 200*l.* If each shareholder would subscribe 2*l.* it would give them 160*l.*; or if 6*d.* per share upon the shares issued were subscribed it would give them about 175*l.* He thanked the shareholders for their patience in waiting for a quorum, and concluded by moving that the report and accounts be received and adopted.

Mr. SHEPHERD seconded the resolution, and remarked that the subscription of 6d. per share appeared to be the most feasible suggestion, but he feared they could not enforce payment.——The CHAIRMAN said that they could not.

The report and accounts were then unanimously adopted, Messrs. Fowler and Tildesley re-elected directors, and a vote of thanks to the Chairman terminated the proceedings.

COLORADO TERRIBLE LODE MINING COMPANY.

The fifth ordinary general meeting of shareholders was held at the offices, Great Winchester-street, on Monday,

Sir CECIL BEADON, K.C.S.I., in the chair.

Mr. F. ANDREWS (secretary) read the notice convening the meeting.

The report of the directors (which has already appeared in the Journal) was taken as read.

The CHAIRMAN said that the circulars which had been issued from time to time as to the progress made at the mine had placed the shareholders in full possession of all the facts known to the directors; and, therefore, it was necessary for him to add but little. The great fact is that they had paid off the debt amounting to 13,000*l.*, and, notwithstanding that heavy burden, they had made a profit of upwards of 8000*l.*, although the whole has not yet been realised, for according to the assurances of the agent in a private letter addressed to him (the Chairman) a few days ago, the ore had been considerably undervalued. It was a great thing that they are now out of debt, and that nothing could occur to interfere with the prosperity of the company. The actual sales of ore in the year had realised 27,000*l.*—of that about 1000*l.* had gone to pay interest, and 13,350*l.* the expenses, the actual amount of ore taken out and the extent of work done is represented by 445 fms., against 414 fms. of the previous year. So that while the amount done was not much larger than the previous year the produce was considerably greater—for instance, there were 85 tons of first-class ore last year, and 42¾ tons the previous year; about the same quantity second-class, and 1350 tons third-class—being 500 tons in excess, and 752 tons of rock, against 403 the previous year. The ore sent to England had sold exceedingly well, and very much higher than their estimate—the average amount last year was 83*l.* 14*s.* per ton net, and that was the value then put upon the stock on hand; this year the actual amount realised had been about 137*l.* 8*s.* per ton, showing a very considerable improvement in the value of the mineral, as the workings in the mountain were increased in depth. The expenses as compared with the previous year were in reality very much less—the previous year the London expenses were 890*l.*, and last year 785*l.*; the interest the previous year 2400*l.*, and last year 1131*l.*; he was happy to say no such item would again appear in the accounts; the mining expenses being about the same figure as last year, notwithstanding a greater amount of work had been done. On the other hand, 10,248*l.* had been realised for first-class ore, 16,000*l.* for second-class—the average for the latter having been 25*l.*, against 17*l.* per ton the previous year. Within the last few days a telegram had been received from Mr. Teal, dated June 20, to the effect that the mine continued to look well, that concentration had started, and that good shipments would follow. Considerable expense had been incurred in erecting these concentration works; they would be actively worked by water-power, and there was a large quantity of ore that would be then treated, and would yield very good results. Reviewing the condition and prospects of the mine, he had no doubt that the results of the present year would be very satisfactory to them all. (Hear.) He then read extracts from a letter he had received from his son, who had been working in the Colorado Terrible Mine, but is now engaged in a neighbouring property. The letter stated:—

"I was all through the Terrible with Harry Lampshire the day before yesterday, and I can only say, as I have said before, the mine is looking splendid. The shaft is down from the bottom of 6th level about 40 ft. The new party are pushing men, and are going ahead very rapidly, and, with ordinary luck, another five months will see it down and timbered, and the 7th level drifts started. They have a vein of rich ore nearly 1 foot wide in the bottom, which, if it continues, will pay for the sinking, and, I should think, give considerable profit. In the breast of 6th level drift they have just come into about 8 in. of mineral, in which there is considerable brittle silver. The two stopes in this level have also good pay in them. The winze now sinking from 5th level to 6th has a good vein of ore all the way as yet. It is now down about 30 ft."

The CHAIRMAN added there was reason to hope that, as the vein in the bottom of the shaft was looking better than in any other part of the mine, the deeper the explorations were extended—as, indeed, all previous experience had proved—the larger would be the returns, and the richer the quality of the mineral. He then moved that the report and accounts be received and adopted.——Mr. EMMENS had much pleasure in seconding the proposition.

A SHAREHOLDER asked whether any of the amount realised for ore sold in Colorado had been retained in Colorado, or whether any had been sent to England?——The CHAIRMAN: That is all retained out there—the expenses out there were about 13,000*l.*; 12,000*l.* had been realised by the sale of ore there, and 1000*l.* sent out.

Mr. SMYTH said very few companies had greater reason to be satisfied with the successful way in which their affairs were conducted, either by the directors at home or the management of the mine, and there were still fewer companies who having raised money upon debentures had ever paid them off. Last November twelve months they owed 9800*l.*, besides 7000*l.*—all this had been paid off, which all must admit was a great cause for congratulation. Some shareholders might imagine a dividend of 1*s.* 6*d.* per share was rather a small one; but if they looked over the balance-sheet they would find a credit for 8600*l.*—so that he should like to propose, instead of having this 1*s.* 6*d.* per share at once, they should wait another fortnight or three weeks, when the forty-first shipment of ore would have been realised, and make the dividend 2*s.* 6*d.* per share.

The CHAIRMAN explained that the directors had considered the matter of the dividend, and the reason which had actuated their recommending a smaller dividend, instead of waiting for a larger one, was this—they had a large constituency in the country, who had not the opportunity of being represented in London, and who were not so well acquaintained with the position of the company as the gentlemen present. They had been waiting for a dividend for a long time, and the board had been led to believe it would be very satisfactory if a dividend were now announced. He was inclined to think this was a right decision; but, of course, it was for the meeting to determine. The directors thought, on the whole, it would be better to declare the small dividend, and put off any further dividend for three or six months. With the mines extending, and the produce improving, and with the additional assistance of the concentration works operating upon this large mass of rock, they would probably in the course of time be able to give large dividends; but he thought it would be more satisfactory to a great body of shareholders if the smaller dividend were declared now.

The CHAIRMAN, in reply to further questions, said there was no fear whatever of getting out of funds. The forty-first shipment had been assayed in Colorado, and had given 461 ozs. of silver—so that it might be calculated roughly as worth 115*l.* per American ton, and the shipment would realise about 1200*l.*

The resolution adopting the report and balance-sheet was put and carried unanimously.

Upon the proposition of the CHAIRMAN, seconded by Capt. DAVIS, a dividend of 1*s.* 6*d.* per share was declared.

Messrs. A. R. Young and R. M. Witham were re-elected directors.

Messrs. Colvin and Marshall were re elected auditors; and, upon the proposition of Mr. HANKEY, a unanimous vote of thanks was passed to them for their gratuitous services.

A vote of thanks to the Chairman and directors terminated the proceedings.

The CHAIRMAN said that, as the business of the meeting had been concluded, he wished to inform the shareholders that with a view to improve the property the directors had had under their consideration a proposition to purchase 500 ft. of the mine belonging to the Clark Mining Company. Probably they were aware the Colorado Company's property consisted of 800 ft. to the west of Discovery shaft, and 300 ft. beyond the Clark Mine—the latter, comprising 500 ft., being situated between the two locations; that is to say, the property of the Colorado Company consisted of 800 ft. on one side and 300 ft. on the other side of the mine belonging to the Clark Mining Company. From the commencement of the operations at the Colorado Mine there had always been a talk about their buying the 500 ft. forming the property of the Clark Mining Company, but the price asked was so enormous that it was quite out of the question. The price originally asked was 60,000*l.*, but there was now reason to believe it could be purchased for 20,000*l.*; and if the vendors would accept the amount in shares of the Colorado Company it would be very much to the interest of the company to authorise the directors to increase the capital to that extent, because it was in effect not only purchasing the additional 500 ft., but, at the same time, of utilising the 300 ft. now unavailable for all practical purposes. This matter could not come before this meeting, because no notice had been given of it; but, if the negociations now going on should prove satisfactory, the directors would probably call a special meeting for the purpose of considering the proposal. It was very difficult for anyone to work so small a property as 500 ft., but there was every reason to believe it was just as valuable if not more so than the 800 ft. they were now working. It was of the greatest possible importance this company should be able to extend its operations; the difficulty they had with the 800 ft. was that they could not develope it fast enough for want of sufficient surface accommodation; they could now only stope about 500 fms. in the year, whereas they ought to be able to stope 800 or 1000 fathoms. If they had this additional ground they would increase the product of the mine without any material increase of expenditure. The raising of the capital from 105,000*l.* to 125,000*l.* would not have a very large effect upon the dividends, whereas the result would more than compensate for the difference by the advantages to be derived from the additional 500 ft., and the facility thus given to utilise the remaining 300 ft.; but the directors would take no steps to commit the company without the consent of the whole of the shareholders.

Upon the proposition of Mr. COLVIN, seconded by Mr. HANKEY, a unanimous vote of thanks was passed to the Chairman and directors, which closed the proceedings.

EMMA SILVER MINING COMPANY.

The adjourned meeting of the shareholders was held at the Cannon-street Hotel, on Tuesday (Commissary General GARDNER in the chair), for the purpose of declaring the result of the poll relative to the election of a director. It will be remembered that at the meeting held about three weeks ago Mr. Alexander McDougall was proposed as a director, to which resolution an amendment was proposed that Mr. Ex-Sheriff Hutton be elected on the board instead of Mr. McDougall. On a show of hands Mr. Hutton was declared elected by a large majority, and a poll was demanded on the part of Mr. McDougall. A poll was also demanded on the question as to whether there should be an increase in the number of directors.

The meeting was called for twelve o'clock, but it was half-past twelve before the proceedings commenced, when

The CHAIRMAN rose and said: Gentlemen, I am very sorry we are kept so long, but the scrutineers have had a very troublesome task, and they have only just finished it.

Mr. A. MCDOUGALL asked the Chairman whether he had received any protest against the poll?——The CHAIRMAN: You are out of order, Mr. McDougall. I must request you to sit down.

Mr. MCDOUGALL: I must ask you whether you have received any protest against this meeting? I ask that as a shareholder.

The CHAIRMAN: Will you be good enough to sit down? We are assembled here for a special purpose, and that is the declaration of the poll. I will now read the report of the scrutineers.

Mr. MCDOUGALL then handed in his protest against the poll.

The report of the scrutineers was then read by the Chairman, as follows:—

"As to the poll taken on the amendment that Mr. Hutton be a director, total number of votes taken personally in favour of the amendment, 643; proxies in favour, 19,855; total for the amendment, 20,498. Of these we agree must be struck off 398, leaving a balance, subject to objections stated below, of 20,100; total number of votes tendered personally against the amendment, 1025; proxies against, less those we agree must be struck off, not exceeding 9721; balance, subject to objections stated below, 10,746. Objections by Mr. Greenip:—(a) proxies in favour of General McCrea, on similar grounds as Mr. Anderson, 205; (b) proxies in favour of Mr. George Anderson on the ground alleged that he did not vote on them, 156; (c) to the whole of the proxies on the ground in the form prescribed by the Articles of Association; (d) to so many of the proxies as are in favour of General McCrea and Mr. Wood jointly on the ground that General McCrea was present and did not, in respect of his proxies, and that Mr. Wood had no power to vote. Objections by Mr. Wood to the votes by proxy against the amendment for want of sufficient stamps, 3256. As to the poll taken on the resolution proposed that the number of directors be increased to 7—total number of votes tendered personally in favour of the resolution, 1585; proxies in favour, less those we agree should be struck off, not exceeding 9061; balance in favour, subject to objections, 10,746; number of votes tendered personally against the resolutions, 710; proxies against, less those we agree should be stauck off, 19,395; balance against, subject to objections, 20,100. The same objections as are above stated to the proxies against the before-mentioned amendment apply to the proxies for the resolution and the objections to the proxies, for the amendment apply to the proxies against the resolution. Assuming that the above-mentioned figures stand, the result of the polling is that the amendment to the first resolution is carried, and the second resolution lost. But assuming further that the objections raised by Mr. Greenip are well founded, the result would be reversed."

Mr. SNELL said there were other points and other objections, and it was not fair that the objections should go to the public in the form in which they had been read by the public.

The CHAIRMAN said he overruled the two objections; the one was that the whole the proxies were not in form, and the other that Mr. Wood and Mr. McCrea were present and did not vote. He, therefore, declared the amendment carried. As regarded the resolution, the same remark applied to that, and he declared that the resolution was lost, on the same grounds that he declared the amendment carried.

Mr. GREENIP wished to know on what grounds?——The CHAIRMAN: I overrule your objections.

The CHAIRMAN then declared the meeting over, and, turning to Mr. Snell, said: Any steps that you choose to take you are aware you can take.——Mr. SNELL: I thank you. (A laugh).—The meeting then terminated.

BURROW AND BUTSON MINING COMPANY.

The half-yearly general meeting of shareholders was held at 21, John-street, Adelphi, on Tuesday,

Mr. J. W. WILLIAMSON in the chair.

The SECRETARY read the notice convening the meeting, and the balance-sheet to Dec. 31 last, showing a credit balance, consisting of cash at bankers' and in hand, and calls due on shares of the first issue of 868*l.* 3*s.* 3*d.*, together with the report of Mr. H. Von Uster, F.G.S., the consulting mining engineer, and Capts. Christophers and Mayne, prepared for presentation to the meeting, were submitted. Subjoined is the report from the mine since received:—

June 29.—Your letter of the 27th is to hand, so I will try to give you the size of our lodes as near as I can. In the 62, going west, we are driving by six men, at 8*l.* per fathom; the lode is 3 ft. wide from foot to head wall, and is composed of quartz, capel, and stones of blende, copper, and mundic. The underlie of the lode in this level is 2 feet 10 inches, and looking very kindly for copper, as the ground is much lighter in colour than it has been in the past, and I am looking for this level to improve daily for copper, as we are driving to meet the course of ore that is dipping east from Wheal Butson. In the 40, west of engine-shaft cross-cut, we are stoping in the bottom by four men, at 4*l.* per fathom; the lode is 4 ft. wide, the underlie 3 ft. in a fathom, and composed of spar, capel, and a leader of blende and copper together, very near clean, about 1 ft. 3 in. wide, worth 2 tons per fathom for copper and blende—that is in the footwall part of the 4-ft. lode, as you have above. In the 40, east of engine shaft cross-cut, we are clearing by two men to get under the course of blende that we are working on. In the 30, west of Tonkin's, we have made good progress since we have commenced to clear. But we are now into a breakdown in the back of the level, but I hope it will not last long; the lode, as far as I can see this morning, is about 3 ft. wide, underlying about 3 ft., composed of spar, capel, and a leader of blende about 6 in., and I am looking for this to improve as we go east, as it is much better than that in the level above. In the 30, west of Tonkin's shaft, we are stoping by six men, at 3*l.* per fathom; the lode is 5 ft. wide, underlying about 3 ft. in a fathom, composed of two leaders of blende, the one about 1 ft. wide, and the other about 6 in. wide—that is, one near the footwall and the other about 1 ft. off the headwall. The balance of the lode is spar and capel, with a little peach in it. This lode is worth fully 2½ tons of blende per fm., as it is at present. In the 30, east of Tonkin's, we are driving a cross-cut by four men, at 5*l.* per fathom, to intersect the north or lead lode that is standing in the level above, about 2 fms. north of the main lode, and we think is going a little further apart as it goes down. We are in now about 3 fms.; we do not see it as yet, but are looking for it daily. In the 20, east of Tonkin's, we are driving by four men, at 3*l.* per fathom, underlying about 3 ft.; this is the north, or lead lode; the lode itself is about 4 ft. wide, composed of one vein or rib of lead about 1¼ inch thick, and another of blende about 4 inches thick. The balance of the lode is peach and flookan, mixed up with killas—a very pretty lode for lead. In this level we have gone through some good lead ground, and are looking for further improvement, which I think we shall get soon, as we are in very near under the place where the old workers had a good lode of lead in and above the adit. But they worked up and took it away, and worked down as far as they could, so that we cannot do anything with it from the adit level, but we must come in at the 20 fathom level, then we shall see what we have there. In the 20 fm. level, west of engine-shaft cross-cut, we have cleared up to the end of ground, and are now driving it by four men, at 7*l.* 10*s.* per fathom; the underlie is about 2 ft. 6 in. in the fathom; the lode is about 5 ft. wide altogether, composed of spar and capel, with a leader of blende and copper about 6 in.; I think it is improving this last 3 ft., and hope it will continue to do so. Our new dressing machinery is all here, and we are going on with putting it in as fast as possible. All other things are working well throughout our mines.—JOHN CHRISTOPHERS.

The CHAIRMAN said that the business upon which the shareholders were called together was that of an ordinary half-yearly meeting, and the directors were desirous of laying the accounts before them, and put them in possession of all the facts with regard to the progress of the mine. In all classes of mining those concerned had had great difficulties to contend with, in consequence of the great depression which had prevailed and the excessively high prices which they had had to pay for every description of material as well as for coal. Indeed, he might tell them that last autumn, when he had occasion to visit Cornwall, the depression was so severely felt that several persons did not hesitate to express to him the opinion that unless there was a great change within twelve months there would not be a tin or copper mine working in the county. He might congratulate them that theirs was not a copper or a tin mine, but a lead and blende mine of considerable value. A year ago they were in financial difficulties, but one of the large shareholders had come forward most handsomely, got them out of their difficulties, and placed the undertaking in a thoroughly sound financial position. Yet this gentleman was acknowledged to be a sharp man of business, and it was unreasonable to suppose that a man of his shrewdness would put his own money into any concern which was likely to prove unsuccessful. For his own part he regarded the assistance thus rendered to the company as an earnest of the shareholder's entire confidence in the enterprise, and it should be considered as such by the other shareholders. In addition to the low prices ruling in the metal markets, the company had had some difficulty to contend with in separating the blende from the other materials with which it was mixed, and thus rendering it fit for market; but he believed that difficulty had now been completely remedied. They cleaned up the mine when they first took possession, but found that, the price being only 50*s.* per ton, it was not worth while to raise it and send it to market, as it cost them 2*l.* per ton, and then they had to risk the cost of carriage before they could sell it. At the present price blende would fetch 4*l.* per ton, which would leave them a good profit, and as the market was improving they might expect it to go to 6*l.* per ton; at 4*l.* per ton, however, they would have but little to complain of. They believed that they had a really good mine, and it could not be in better hands than those of their managing director. Under him the mine had been economically, efficiently, and admirably worked; in fact, no mine was in a better position, whether considered as to locality, machinery, or finance. They had an abundance of blende which they could now sell at a profit, but he hoped it would turn into a lead lode. Under any circumstances, he thought it probable that as they got deeper they would get more lead. Prices varied very much, and for this reason they had discussed the question whether they could not smelt their own ore. Of miners and workmen they had a full complement, and Captain John Christophers, their principal agent, was as honest and hard-working a man as could be found; they had, moreover, first-rate machinery, and were not in want of funds. He believed he had mentioned every point of interest to the shareholders, but would be happy to supply any omission by answering whatever questions which might be put. He concluded by moving that the accounts be received and adopted.

Mr. C. MORRIS seconded the motion.

Mr. H. VON USTER, F.G.S., remarked that the report received at the office that day fully confirmed that which had been forwarded to the shareholders with the notice convening the meeting; the only difference being that the several points looked somewhat better. It had been suggested that they might have had specimens of the lead upon the table, but their managing director considered that it might appear that they were too desirous of making much display, and that it would be better for the shareholders to see them at the company's offices. He might, however, mention that the lead was 10 in. wide, and nearly solid, being worth 75 per cent. for lead. They could see the foot-wall and hanging-wall on the sides, which proved that it was not an isolated specimen, but part of a true lode. The Chairman had entered so fully into all particulars with regard to the progress of the mine that it left but little for him to say. Their agents would have attended the meeting as usual, but they were at the moment too fully engaged, new machinery being on the mine, and Capt. Christophers could not be spared, as they were pressing on to get it ready. They sold one parcel of blende which was lying at Truro for 127*l.*, which would with the other sales come into the next accounts. The engine-shaft had been sunk between copper and lead; on the east of the shaft they had had lead, and on the west copper. They were now driving the 20 east, and stoping. They had some lead, and hoped every day for improvement. The bottom level had been temporarily suspended, because the funds were short, but would now shortly be resumed. Many persons stated that the lead in their ground was dipping towards their shaft, which would be a great advantage, but he was not prepared at that moment to say positively that it was doing so. He felt sure that their bottom level would bring them into good ore ground, and he was glad to say that the price of copper was improving, and that the copper ore from the Burrow and Butson had always had the reputation of being the richest in the neighbourhood. The Chairman had very kindly referred to Capt. Christophers' valuable services, and he could fully confirm all he had stated. He had observed his good qualities in the adjoining mine, Great West Chiverton, and in consequence promoted him to his present position. With their new machinery they would be able to dress and sell both blende and copper regularly, and they would not be under the necessity of wasting their blende on the copper smelters, and their copper on the blende smelters. He regretted the comparatively small attendance of shareholders, but might explain that it probably arose from the meeting having been inadvertently fixed for June 30, a day upon which many of their London shareholders, being connected with banking business, could not attend.

Mr. R. A. HILL had noticed that the price of blende was quoted 5*l.*, or some other price per ton, and would be glad to know to what percentage of metal the quotation referred?——Mr. VON USTER said that the average percentage of the blende was 50 per cent. He might mention that in their case they would get their absolutely clean blende upon very favourable terms, for they estimated that the copper and sulphur obtained would pay the whole cost of separation, or, at all events, it would not cost them more than 1*s.* per ton to make it ready for market. If the blende were clean he did not doubt that in a short time they would get 6*l.* per ton for it, at which price the company would obtain a large profit. He believed that within twelve months the shareholders would be congratulated upon their very favourable prospects. The question of smelting their own ore had been discussed, but it was not considered advisable at present; if, however, the blende smelters were too illiberal the shareholders might determine to form an independent company to provide the necessary means for doing so.

Mr. JOHN SELBY enquired whether any of the shares of the company had been given away as free shares? and also complained that the amount of a call which he had paid for his daughter was not included in the accounts.

The CHAIRMAN said that there were no shares which had been given away; but that there were the shares paid to the vendor as part of the purchase price, upon which the company had not actually received cash. As to the payment which Mr. Selby referred to, he would remind him that the balance-sheet only extended to Dec. 31 last, and his payment would be regularly shown in the next balance-sheet.

Mr. SELBY was quite satisfied with the explanation, but did not think the matters were clearly shown in the balance sheet.

The CHAIRMAN remarked that the balance-sheet was drawn by Messrs. Harding, Whinney, and Co., and audited by the shareholders' auditor, and it was explained in the first paragraph of the directors' report that there were open accounts which would be adjusted in the next balance-sheet. He was, however, glad for any shareholder to make enquiries upon any point not clear to him.

Mr. E. WHITTLE did not see any item for ore sold from the mine, nor estimate for ore raised, although he understood long since that there was much on the mine.

The MANAGING DIRECTOR said that as to ore sales there had been none until since the date at which the accounts before them were closed. The balance-sheet showed their actual position at Christmas last. As to the ore raised, he considered it ought not to appear in the accounts until it was really sold, and so long as he remained managing director ore sales would not be brought into the balance-sheet until the money was actually realised. He would do precisely the same in his own business, but there would always be differences of opinion as to accounts.

Mr. C. MORRIS remarked that it was not unusual in mining companies' balance-sheets to estimate the value of ore on hand.——Mr. VON USTER said that there was ore on the mine at the date of the previous meeting, but as the price was very low the directors decided not to sell.——The MANAGING DIRECTOR said that blende had been sold since the date of the balance-sheet, and would duly come into the next.

The CHAIRMAN, in reply to questions from shareholders, stated that about half of the price of the machinery had been paid, and about 300*l.* remained to pay. There was about 800*l.* due from shareholders, most of which was secured, and the whole was considered by the board to be perfectly good debts. They had no thought at present of forfeiting shares, as the directors always considered it preferable to suit, as far as possible, the convenience of shareholders. Were they in immediate want of funds they might be compelled to act more stringently.

The motion for the reception and adoption of the accounts was then put to the meeting, and carried unanimously.

Mr. Charles Morris was re-elected a director, upon the proposition of the CHAIRMAN, seconded by Mr. THOS. MILNES; and, upon the proposition of the MANAGING DIRECTOR, seconded by Mr. C. W. NICHOLS, the Chairman was re-elected.

A cordial vote of thanks to the Chairman, proposed by Col. JERVIS, and seconded by Mr. W. T. NELTHROPP terminated the proceedings.

PROVIDENCE MINING COMPANY.

At a meeting of adventurers, held on June 24, the accounts showed a debit balance of 2632*l.* 13*s.* 2*d.* A call of 2*l.* per share was made. In consequence of the extension of the working of the mine and the employment of a greater number of hands the duties of the manager, Capt. Hollow, having been considerably increased, and it being found necessary to appoint a second agent to assist him, it was resolved that Capt. Hollow's salary be 120*l.* per year from the next pay-day, payable monthly, his engagement to be determinable on either side by one month's notice from any pay-day. Capt. Samuel Rogers was re-apppointed agent, at 91*l.* per year, his engagement also to be determinable on either side by one month's notice from any pay-day: 36 shares were relinquished. The following report was read:—

June 24.—The Standard lode in the 85 east is small and unproductive; now being driven by four men, at 8*l.* per fathom. There are 15 fathoms more to drive to get under some good tin ground gone down below the 75. In this level north we are opening the end by four men, on a lode going 20° east of north; this is being done instead of driving the cross-cut north; it will prove the tin ground now being stoped in the back on the same lode by six men, at 4*s.* 6*d.* in ½. tribute. The lode in the winze sinking below the 85, on No. 3 lode, is 2½ ft. wide, worth 15*l.* per fathom; now being sunk by four men, at 12*l.* per fathom. The lode in the winze sinking below the 75, on No. 3 lode, is 2 ft. wide, worth 25*l.* per fathom; now being sunk by four men, at 10*l.* per fathom. The south lode in the 75, driving east, is 3 feet wide, worth 20*l.* per fathom; driving by four men, at 11*l.* per fathom. There are six men in the back of this level on tribute, at 4*s.* in ½.; this lode is not worked below the level, and is the tin ground referred to at the 85 east. The north lode in the 75 is 3 ft. wide, worth 20*l.* per fathom; driving by four men, at 15*l.* per fathom. Hewke's shaft is complete to the 36, and skip-road fixed. The 26 is driving west by two men, at 5*l.* per fathom; the lode is 1½ ft. wide, of low quality. There are four men in the back of this level, at 7*s* in ½. tribute. The 14 is driving west by

two men, at 4*l.* 10*s.* per fathom; the lode is 1 ft. wide, worth 4*l.* per fathom. There are 18 pitches working on tribute by 58 men, at an average of 10*s.* in 1*l.* at the present price for tin, and 35 on tutwork; total underground, 93. From the present appearance of the mine if tin does not recede in price I think we can pay cost.—WILLIAM HOLLOW.

WHEAL JANE MINING COMPANY.

At a meeting held at the mine, on Thursday last, a profit was shown on the three months' working of 219*l.*, which left a credit in favour of the adventurers altogether of 251*l.* The labour cost for February, March, and April was 1794*l.*; bills, 93*l.*; and dues, 173*l.* On the other hand, the credits were 3126*l.*, leaving a profit on the 27 tons of tin stocked from March last of 135*l.* There are 55*l.* tons of tin on the mine credited in this account, also not sold, at 54*l.* per ton, amounting altogether to 2970*l.* This makes 82 tons of tin credited and not sold, and computed at 4428*l.* Against this they owe to merchants 1531*l.*; to their bankers, 2197*l.*, and other liabilities. Mr. Alfred Lanyon has relinquished 32 shares. It was proposed by Mr. Hawke, seconded by Colonel Perceval, and carried unanimously:—"That the statement of accounts as read, showing a profit on the three months' working of 219*l.*, together with 32*l.* brought from last account (making 215*l.*) be carried to the credit of the next account." It was also resolved that the thanks of the meeting be accorded to the committee for the course they have taken in continuing the working of the mine, &c.; that the tin be still placed at their discretion for disposal; and that in the interim they be empowered, if found necessary, to overdraw the account with the Miners' Bank another 2000*l.*, in addition to the 3000*l.* The agents reported:—Since the last general meeting our tut-work operations have been confined to the working of two bargains. The Tremayne adit level is extended west from shaft 104 fms.; the lode is 1 ft. wide, and worth 20*l.* per fathom, driving by three men and three boys, at 8*l.* 8*s.* per fathom; this end is now about 7 or 8 fms. above a pitch, working by 12 men, at 4*s.* 6*d.* tribute. At this point we have every reason to expect a long and lasting bunch of tin, as it has continued from the 60 fm. level up. The deep adit level rise is now up 5 fms.; the lode is 6 ft. wide, and worth 8*l.* per fathom, rising by three men and three boys, at 7*l.* per fathom. We anticipate a good lode in this rise, as it is going up in the run of tin ground above. We have nine tribute pitches working, from 4*s.* 6*d.* to 13*s.* in 1*l.* In the past three months we have considerably curtailed our tut-work and other expenses, and with the low standard several of our old pitches have not been able to be worked; yet we are glad to say our tin has fallen off but little in quantity. With a few pounds' advance in the price of tin, this mine would at once take its former position as a dividend-paying mine.

The committee reported as follows:—After such an unprecedented and disastrous quarter of a year as tin mining has had to pass through, bringing destruction to many mines, and threatening the existence of almost all, it is a real pleasure to the committee to be able to address you once more from this account house as your representatives, and to refer to the course of their proceedings since they met you at the very discouraging meeting on the 29th of March last, when, on the presentation of their report, they were authorised by a resolution of the meeting to suspend for a time all further working of the mine, to which they hastened to give effect by giving the usual month's notice to the whole of the people under your employ; but before the expiration of which indications of improvement in the tin market began to manifest itself. The committee then, under these more auspicious circumstance, held a consultation with the agents, who, with themselves, were unanimous in considering it to the last degree expedient to continue the limited operations of the works for at least another month rather than closing the concern altogether, and sending old and deserving servants all over the country, never to be got together again; this course affording also opportunity for the development of the tin trade, which happily has now become more encouraging, though, of course, leaving plenty of room for further improvement. By this procedure they have been able to work the mine, not only without loss, but to some profit, even with tin at only 54*l.* per ton, as you heard by the accounts just read, but you will observe the tin is only credited, not sold, and in addition to the 27 tons in March, Capt. Hall has dressed and put to the tin house this quarter 55 tons—making the entire stock 82 tons. The committee trust the course they have pursued under the late trying and perplexing condition of the tin market will meet with your approval, and they now ask for the expression of your opinions thereon for their government; and as it may be sound policy to still continue holding the tin for a time longer, you will perhaps authorise the committee, if found necessary in the interim, to further overdraw the account at the Miners' Bank another 2000*l.*, in addition to the 3000*l.* already authorised, placing the tin for disposal at the direction of the committee.

WEST CHIVERTON MINING COMPANY.

An extraordinary general meeting of shareholders was held on the mine on June 27—Mr. A. C. GLUBB in the chair.

The usual preliminaries having been disposed of, the accounts for the 16 weeks ending April 25 were submitted, showing a loss on the working of 955*l.*, and a credit balance of 1389*l.* were presented, and the subjoined report from the agents submitted:—It stated that the ground in the new engine-shaft was more favourable for sinking, and they hoped to make good speed in getting to the 150. The 140, west of new engine-shaft, has improved very much in the past three weeks, and is now worth 25*l.* per fathom. A winze sinking below the 130, ahead of the 140 end, is worth 30*l.* per fathom, and from present appearances no doubt is felt that a profitable piece of ground will be opened out here. After referring to other points of operation the report concluded:—"You will see from the accounts our returns during the past quarter have been increased, although the 140 fm. level up to this time has not opened out to our expectation; and, judging from the ore ground gone down in the bottom of the 130, we see no reason to doubt that the returns during the coming quarter will still be further increased."

The CHAIRMAN explained that at the previous meeting a resolution was passed authorising the purser to overdraw the banking account to the extent of 2000*l.* or 3000*l.* This resolution was neither good in policy or law, and the bankers declined to allow anything like a permanent overdraw. The purser wanted between 2000*l.* and 3000*l.* immediately, and as he could not obtain it from the bank he thought his only alternative was a call, and he could not get a call made unless he gave notice of it. He was perfectly aware of the difficulty there would be in collecting a call if one were made, seeing that the shareholders, numbering 330, were scattered all over the world, and it was not without a good deal of consideration that he inserted the words in the notice that a call would be made if necessary. The same bankers have had the account from almost the commencement of the mine; the turn over has been something like 70,000*l.* a year, and recently they had been paid about 400*l.* a year for interest and commission. It was a little surprising the accommodation asked was refused, as there was about 4000*l.* worth of ore bills coming to hand in a week or two. But he would point out that although the bankers might refuse any permanent overdraw, they perhaps would not refuse a temporary overdraw in the face of these bills. If they did so the account would have to be withdrawn.

Mr. GRANVILLE SHARP, who held nearly half of the proxies (between 600 and 700 shares) represented at the meeting, enquired whether they hoped to meet cost, as he considered that if they went on as at present a call would be inevitable? He thought the mine had been worked for the shareholders in Cornwall exclusively.

Mr. BLAKEY, of Leeds, remarked that the price of coal had gone down, and enquired whether they had plenty of labour?——Mr. V. PEARCE said that the Cornwall Minerals Railway had discharged a large number of hands. They were now very much better for labour, and the men were settling down.——Mr. BLAKEY enquired the value of the reserves, as he had heard the mine had been worked unfairly, though he must say from the enquiries he had made he believed the mine was honestly worked. If coals came down in price and had improved they would go on well.

Mr. CLOGG said the average price of coal last quarter was 17*s.* At present they only owed the bank 270*l.*, and they had paid one month's additional cost—1588*l.*—the previous Saturday. The May costs were not included in the accounts presented ——Mr. PEARCE supposed the bankers would not advance another shilling, and feared they were leaning upon contingencies; but at the end of the next three months they might be worse off than now. And if the bankers would not advance them another penny, how did they propose getting the money to carry on the mine?——Mr. CLOGG remarked that that was the very point that required their careful consideration at the present time. They wanted 800*l.* immediately for dues which should have been paid before; they also owed 1100*l.* to merchants, and in the next fortnight they would have to pay 300*l.* or 400*l.* for coals. They were really indebted 1888*l.*

Capt. JULEFF believed they would very nearly meet costs. They hoped to open out some good ground, but the great thing against them this quarter had been that the lead had gone down in price, an average of 1*l.* 6*s.* 6*d.* per ton, and that upon 519 tons makes a difference. The jack made 130*l.* less. The mine itself is producing a fair quantity of ore. They had reserves, and were making reserves, but he had not calculated the amount. There had not been an ounce of ore taken out unfairly. After calculating, he said they had 20,000*l.* worth of reserves, against 35,000*l.* twelve months since. He could not suggest how they could much reduce expenditure underground, but four or five surface men might be dispensed with. He considered the stamps better for their purpose than the crushers; they were obliged to bring down some ore finer than the crushers would bring it, in order to get the lead out of it. Every item in reference to the stamps had been kept separate to show the profit. They had sold 690*l.* worth of lead from the stamps, and the cost of preparing it was about 20 per cent. of that amount. The large heaps of refuse which they were putting through the stamps were not nearly exhausted.

Mr. SHARP would like two thoroughly practical and independent men to inspect the mine—to have a thorough inspection of it, and to take time to do it. He knew that would be the wish of the shareholders whom he represented, and he proposed that such a course should be adopted—not out of any want of confidence in their present managers, but he thought it would give greater confidence to outside shareholders.——Mr. WOODWARD seconded the resolution. He believed they had confidence in the agents, but, at the same time, the adventurers had been disappointed at not getting any dividends, and if the mine was inspected by well-recognised practical authorities, he thought it would materially enhance the value of the property, and restore faith in the management.

Mr. BLAKEY said the fear had arisen chiefly from the large number of Cornishmen that had gone out of the mine who had derived the profit out of it. That made people think things were not as they should be, and had, perhaps, given rise to rumours that were not correct. If the report of their agents were confirmed it would be all in favour both of the managers and their mine. He had no fear but that they would be confirmed, as he had the fullest confidence in them. He seconded the proposition, and it was carried unanimously.

Capt. Josiah Thomas and Capt. Thomas Richards were the gentlemen named for the duty, and Mr. Sharp intimated that he would appoint Capt. Southey to inspect the mine for him.

Mr. CLOGG, with reference to the financial position of the mine, said that they must by some means endeavour to raise nearly 2000*l.* immediately.

Mr. SHARP spoke in strong terms of the action of the bankers, who, he said, had made a very good thing out of them, but now that they were pinched a little refused to accommodate them. It was only a temporary overdraft that was required, and he saw nothing to warrant such a course of action.

Capt. JULEFF said he did not think they should make a call at present. They were likely to increase their returns, and they would have regular sales of ore.

The CHAIRMAN thought the bank would not refuse to advance the money required with these bills before them, although they would not permit a permanent overdraw. It was ultimately resolved that the purser be authorised to withdraw the account if the bank refused to advance the money required, and obtain it on the bills from another bank.

The PURSER then stated that he had heard nothing definite in answer to the application for a reduction of dues, but Mr. Downing had informed him that he did not anticipate the question would be considered until the annual meeting of the lords, in November. Mr. Downing had also told him that he did not think the lords would re-open the question of the premium.

On the motion of Mr. SHARP, it was resolved that all future meetings should be held alternately in London and on the mine, and the next meeting should be held in London.

The business having been concluded, the adventurers dined together, and the agents in responding to the toast—"Success to West Chiverton"—spoke very confidently as to the future of the mine; and Mr. SHARP and Mr. BLAKEY, in acknowledging the toasts of their healths, stated that the meeting had resulted in a much more satisfactory way than anticipated, and they would be able to give an encouraging report to their friends.

LLANHARRAN COLLIERY COMPANY.

The ordinary general meeting of shareholders of this company was held at the offices, 110, Cannon-street, on Tuesday,

Mr. A. BARLOW in the chair.

The report of the directors, which was taken as read, stated that, including the amount payable to the vendor in shares issued and fully paid-up, 60,080*l.* of the capital of 75,000*l.* had been allotted, and the remaining 14,920*l.* would be offered to the shareholder as occasion required. Warrants for the interest guaranteed by the vendors, and payable to June 30, would be issued on the 30th inst. The works were being constructed as rapidly as possible, and due provision was being made for a large output of coal. A stone quarry contiguous to the mine had been acquired free of royalty for the company's use, which would be of great advantage in the construction of the works.

The CHAIRMAN, in moving the adoption of the report, congratulated the shareholders upon the prospect before them, mentioning that since the report had been issued they had struck a seam of upwards of 6 ft. thick, the coal from which appeared to be very good, and he had no doubt that they would get for it a ready sale.——The motion was seconded by Mr. BROWSE, sen., and carried, after which the retiring directors and auditors were unanimously re-elected.

The meeting was then made special, when a resolution adding to the title of the company the word South was passed. This change was rendered necessary, from the fact of a private company trading in the immediate neighbourhood under the title of the Llanharran Coal Company, and thereby causing some inconvenience to this company.

The proceedings were brought to a close with the usual vote of thanks to the Chairman.

WHEAL AGAR MINING COMPANY.

At the general meeting of shareholders, held at the offices of the company, Cornhill, on Wednesday (Mr. JOHN WESTON in the chair), the accounts for 12 months, showing a balance due to the bankers of 477*l.* 8*s.* 3*d.*, were passed, and a statement of liabilities and assets, showing a balance against the adventurers of 3091*l.* 0*s.* 6*d.*, was also submitted. To meet this liability a call of 8*s.* per share was made.

The CHAIRMAN stated that no meeting had been held since July 1, 1873, in consequence of the limited operations that had been carried on pending a settlement of the water question with East Pool Mine. He was happy to say that litigation had been avoided, and that the appointment of two gentlemen to arbitrate on the difficulty between the two mines had resulted in a satisfactory arrangement to both parties. Every effort is now being made to fork the water to the bottom of the mine, so that vigorous operations could be commenced on the lode discovered at the 150, worth 30*l.* per fathom. It is necessary to make rather a heavy call on the adventurers to meet the adverse balance, but when it is considered that 12 months have elapsed, and no demand made on the shareholders in the meantime, the charge is not so much as might reasonably have been expected. All superfluous machinery and materials have been disposed of, with the exception of about 400*l.* worth, which will be realised as soon as practicable. The committee have taken advantage of the offer of some stamps, &c., and have purchased them at a reasonable figure. We hope at the next meeting to be in a position to lay before you a more satisfactory statement of accounts, and a more favourable report as to the future prospects of the concern. In the meanwhile the shareholders may rest assured that every endeavour will be used to curtail expenses as far as is consistent with the development of the mine, and to place this valuable property in such a position as is justified by its well-known merits.

WEST TOLGUS MINING COMPANY.

A meeting of shareholders was held at the account-house on Monday,—Mr. J. TAYLOR, of London, presiding. A favourable report was anticipated, and there was a large attendance of adventurers.

The CHAIRMAN read the notice convening the meeting, and regarded with pleasure the fact that for once they had not found it necessary to say anything about calls in that circular. The accounts, as read from the chair, showed that the labour cost for April was 741*l.*, and for May 782*l.*, merchants' bills to the end of April 1273*l.*, charged on account of 13th month 120*l.*, making a total of 2918*l.* On the other hand, 478 tons of copper ore had been sold, which brought 2743*l.*, showing a loss on the two months' working of 174*l.* The cash account showed a balance against the adventurers brought forward of 1136*l.*, and, adding this to the present loss, there was a total debit balance of 1310*l.* Calls had been received which reduced that balance to 342*l.*, and the arrears of calls amounted to 64*l.* only, and at the next account this, he had no doubt, would be all paid, as the two persons who were in arrears were well able to pay, and it was no doubt through carelessness that they had not paid.

Mr. HEARD: Then the real fact is that after calling up 50,000*l.* of calls, you have about 60*l.* in arrear. That shows what a capital body of adventurers we have here.

The CHAIRMAN then read the agents' report, which was of a very favourable and promising character. After referring to the various points in the mine, the report concluded as follows:—

The lode in the 85 fm. level west is 8 ft. wide, yielding 12 tons of ore per fathom; dressing by six men, at 7*l.* 7*s.* per fathom. The rise, which was stated at the last meeting to be 11 fms. behind the end, has been communicated with the 75 fm. level, the lode yielding 8 tons of ore to begin with from the 85 fm. level; where holed, 5 tons per fathom. The rise men are set to stope west from the rise in the back of the 85 lode, yielding 10 tons of ore per fathom; worth 60*l.* per fathom. The lode in the 55 end east is 3 ft. wide, unproductive; driving by four men, at 6*l.* 10*s.* per fathom. There is one stope in the back of the 55, east of shaft, by six men, at 4*l.* 10*s.* per fathom; yielding 3½ tons, worth 20*l.* per fathom. Since our last meeting our prospects have continued to improve, the 125 and 85 having opened up very fine courses of ore for 8 fms. in length in each end, and the improvements in the 75 and 95 west lead us to hope that we may soon meet with courses of ore in them also. Our sales of ore for the next account realised 2934*l.* 1*s.* 3*d.*; this we anticipate will give a profit of 850*l.*, and enable us to pay off the debt against the mine and leave a surplus of about 500*l.* Our quantities of ore having increased, we have thought it advisable to have monthly sales, and accordingly sampled last week 200 tons of good ore as a first sale for the July and August account.

The CHAIRMAN observed that there were a few things to which he wished to draw the attention of the meeting. They would see what was stated in regard to their anticipations for the next two months, and he believed that hitherto their prophesies had been found to come pretty near the truth. The amount of ore raised they knew exactly, and the amount of costs had been estimated carefully. They had, from the accounts, read the certainty of having to meet a debt of 342*l.*, and that did not include dues. They were aware that they had not paid any dues in the mine for a long time past, and as yet they had had no demand for dues up to the closing of the accounts read that day; but he, of course, thought that they must anticipate that, when they could see their way clear to declare a profit, such a state of things could not continue, and they should anticipate that before the next account they would have to arrange with Lord Robartes as to what dues they should pay him, for that they would have to pay him some time or other he thought none of them would dispute. On one occasion their lord was good enough to reduce their dues from 1-20th to 1-40th; and afterwards, at his own pleasure and to their satisfaction, when he saw the condition they were in, he remitted them altogether. Of course they must leave it to him to determine what dues they should now pay, whether or not it should be 1-40th, which they paid before the total abandonment of the dues, or a higher rate. Anticipating that they would not have to pay more than 1-40th, the calculation would be that they would have a surplus of 500*l.* after paying this debt of 342*l.*, but if they had to pay further back there would be a small surplus. That was about the state of the concern at present, and they certainly had every reason to feel confidence at the fine courses of ore they had now opened up. Their two principal levels—the 125 and 85—would, there was no doubt, continue to improve, there being at present, so far from deteriorating, every appearance of their increasing in value, and in other levels there were indications in a similar direction. In the 75 and 95 they might hope soon for good bunches of ore, and in the 105 they expected speedily to be enabled to present a good report. Their old enemy the water had of late behaved better to them, and had caused them but little difficulty, but the price of coals was still high, and rendered the management of the water costly, and in getting proper men for this particular kind of work they had had considerable difficulty. In putting down the shaft they had some difficulty in getting good men, but they had been fortunate in obtaining some good sumpmen, but they were in a ticklish state, and were every now and then going away. They must try and keep them and add to them if they could.

Mr. HEARD thought that it was to the interest of Cornish mining that they should keep the men in the county, and pay them fair wages as an inducement to remain.——Capt. HANCOCK said their was no discontent amongst his men; they all seemed well satisfied, but the more wages that was given them, the more they would go abroad.——The accounts were passed and the balance carried forward to next account, and the business then terminated.

The adventurers afterwards dined together, and on the removal of the cloth, and after the usual loyal toasts were given,

The CHAIRMAN gave "Success to West Wheal Tolgus." For 14 years many who sat at the table had been drinking that toast, and that, too, at times when people had told them it was folly to indulge in any anticipations of the possibility of success. They had always, however, had confidence in the mine; they had had to struggle against adverse circumstances of one kind and another, and they had encountered nearly all those difficulties with which honest miners sometimes had to contend. At the present moment they seemed to have mastered these, and they had reached a point when the mine itself gave as great promise as they could ever hope for. If things went on in such a manner as they appeared likely to go on, he thought that they would soon see that which had been for a long time wanted in the county of Cornwall, a good copper mine. No good copper mine had certainly sprung up in their county for a great many years; there were what might be termed a few good ones, but he believed that they all had an idea that pretty soon West Tolgus would be the best of the lot. (Applause.) The difficulties the management had met had always been treated with great consideration by the adventures, and he felt grateful for the manner in which the committee had been supported in times when it had been much in need of sympathy. Encouragement had also been given to such an extent as few other mines in the county could boast of, by the lord of the mine, and of that they could not be unmindful. In the opinion of many of their friends, the smelters had served them worse than anyone else, but he confessed that he was not one of those who raised his voice in the cry against that class, for he thought that they had had difficulties with the rest of them, and he did not believe that they had acted with miners in an otherwise than fair spirit, nor did he think that their profits had been unreasonable. They had been obliged, like themselves, to bow to circumstances, and he trusted that they might now expect something better from that quarter. There had been, as they had perceived, a gradual, though not very large rise in the price of copper for some little time past, and the market had worn a much healthier tone. They might, therefore, he trusted, look forward to much better prices for their produce in the future. They only wanted good prices to give them good dividends, and to get West Tolgus into a fair and proper state for her to become a most durable and satisfactory mine for all connected. He trusted that as soon as they made a little profit, there would be no undue eagerness to "seize upon the prey," for he trusted that they would lay aside sufficient to protect them from the future casualties such as they had experienced, in order that from prosperity they should not be suddenly necessitated to demand calls from reluctant shareholders. He was happy to think they had now tided over their difficulties, and hoped West Tolgus would enjoy a long period of prosperity. (Loud applause.)

The CHAIRMAN next gave "The Health of Lord Robartes." He had so often had occasion to pass the highest encomiums on the conduct of the lord that he could now only remind them of the noble manner in which he had always treated them, never requiring to be begged and entreated to grant relief, but proving himself to be one who could, from personal knowledge of mining, appreciate the difficulties of mine adventurers. When he found them in difficulties he not only volunteered to remit the dues, but to pay back what he had received for a certain time. Lord Robartes was, in his mind, a model of a lord of mines, whom other owners of property in the county ought to follow. Lord Robartes had been as liberal in other cases as in theirs, and he had perfect confidence that when they came to him to ascertain what his intentions were for the future he would decide in a liberal and proper way. (Applause.)—*West Briton.*

[For remainder of Meetings see to-day's Journal.]

RECOGNITION OF APPLIED SCIENCE—THE CITIZENSHIP OF LONDON.

Among those who have energetically devoted themselves to the useful application of science Sir Charles Lyell, Bart., has long occupied a prominent position, and on June 25 his labours were substantially recognised by the Company of Turners in presenting him with the freedom and livery of the Guild at a Court specially held at the Guildhall. The room in which the ceremony took place was hung with diagrams of geological strata, and several interesting specimens of the science were exhibited in different portions of the apartment. The chair was occupied by Prof. Tennant, who is a past master of the association. There was a considerable number of persons present, including many ladies, to witness to the ceremony. Upon the Court being opened, and the minutes which had been passed at the last meeting read, the resolution whereby the company was authorised to present Sir Charles Lyell with its freedom was also made known: it stated that the honour was conferred "for his original investigations and published communications respecting the structures and sources of materials used in the art of turning, as well as for his comprehensive and elaborate treatises upon the geology of all parts of the world."

The presentation was made on behalf of the Court by Mr. JOHN JONES, who said:—Sir Charles Lyell,—About five centuries ago—presumably about the time this company was incorporated—the municipality at Rome gave the laurel crown to a member of the Italian Bar, who had relinquished his profession for the more congenial study of philosophy and poetry. His writings had enriched and beautified his native language, and have ever since been a fund of thought and sentiment for the use of mankind. His name was Petrarch. About 30 years ago I was in Antwerp, and found the city decorated with allegorical paintings, with trees planted by the pathway, and with festoons of flowers from the houses, in celebration of the memory of one of their citizens, both a diplomatist and painter, whose works had given celebrity to the Flemish school, and have since remained an attraction to the world in the public gallery of the city. His name was Rubens. You, Sir Charles, have done as much for your countrymen as either of those distinguished men did for theirs. You, like the great Italian, relinquished the profession of the Bar for the more comprehensive study of geology. You have added a new department to the literature of England, and your volumes which contain your observations and inferences on the structure of the earth, while conveying information on the profound secrets of Nature, are so felicitously written that they fascinate like the pages of romance.

> Oh, Heaven! that one might read the book of fate,
> And see the revolution of the times
> Make mountains level, and the continent,
> Weary of solid firmness, melt itself
> Into the sea; and other times to see
> The beachy girdle of the ocean too wide for
> Neptune's hips!

Was the despairing exclamation of Shakespeare. What he regarded as the impossibility of a dream you have shown to be a phenomenon passing before our eyes. To every landscape of England you have added an additional charm, for every hillside and valley, every river and every plain, taught by you, yields us traces of the forces by which they have been configured—forces more potent than the armies of the Continent, which no diplomatic skill can baffle. Every wave and wind, every season and tempest, under your instruction, we recognise as members of those great forces of Nature by which the cosmical conditions are determined which govern the existence of our race. The hot blasts from the soil of Africa melt the snow on the Alps, and the wasting deluge desolates the plains of Lombardy; or the slow emergence of land at the Pole may render this island habitable only for the Esquimaux. In Bunyan's "Pilgrim's Progress" is a description of the Hill Difficulty and the Delectable Mountains. It is thought that St. Catherine's Hill, at Guildford, and the adjacent chalk ranges gave him the model which he pourtrayed, but under your teaching every cubic yard of every hill in England is entitled to the appellation "Difficulty" to the student in exploring the hidden lore of chemical and organic structures with which they are replete—the light by which he can read the records of primæval life, and assign to its place in the successive formations of the earth the substance under his notice. Sir Charles, we welcome you to the ranks of the Turners' Company, not because you have received favour from the Crown, the fountain of honour—not because the University of Cambridge has conferred on you academic degrees—not because you hold high rank in society, though that might be argument for admission into some of our less intellectual sister guilds—but because your work has promoted the art which we govern. Our present Chairman (the late worshipful Past-Master) taught us that the manipulatory skill with the graver against the revolving lathe is not sufficient to constitute an accomplished turner, not even the possession of a sense of beauty, which finds its expression in every shaving of his work, but that a knowledge of the materials on which he works his structure, their locality in the earth's storehouse, their characters—are all to be accounted as invaluable in a thorough turner. In our next competition we have offered prizes for work in metal, stone, and gems—all parts of the subject which you have cultivated. I have spoken of Rome and Antwerp. I need not say that the Turners' Company is not the Corporation of London, though I may say it is the most active section of that community, one that most loyally fulfils the obligations for which charters and political privileges have been granted, the advancement of the art to which we belong, failing which regard municipalities are but gilded beadledoms, and guilds but carousing companies. For centuries the names of the men with which I prefaced my remarks have given lustre to their respective cities. In centuries yet to come we may anticipate that the work we have done to-day will give lustre to the Turners' Company, and that some future historian will pay us honour when he finds on our rolls the name of Sir Charles Lyell.

At the conclusion of Mr. Jones's speech, Mr. Shirreff, the clerk of the Court, administered the oath to Sir Charles Lyell, after which that gentleman subscribed his name on the roll, amid the plaudits of those present.

Prof. TENNANT said: It is with pleasure, Sir Charles, that I have the honour to admit you to the freedom of the Turner's Company, of which I was last year Master. My successor—Mr. Sadgrove—requested me to take his place on this occasion. I beg to inform you that you were unanimously elected by the Court. In 1819 you were elected a F.G.S., and in 1831 the First Professor of Geology in King's College, succeeded by Prof. Phillips in 1834, who two months since was elected a freeman of this company, and I was in three weeks after attending his funeral at York. From 1853 to 1869 I held the Geological Chair at King's College, in addition to that which I still retain of Geological Mineralogy, and I am thus enabled to speak of your valuable services to geology. For upwards of 50 years the public have witnessed the zeal displayed by you in making known the great truths to be learnt by studying the rocks on which we tread when the science had to encounter opposition which you have greatly succeeded in suppressing. Your numerous works have contributed largely to decipher the hieroglyphical characters (not of Egypt, which are comparatively only of yesterday), but of organic beings of countless ages. These in many cases have left only fragments of the internal bony structure or external covering, and these imperfect evidences taken alone would not be safe, but placed in the hands of naturalists we become enabled to comprehend their geological history. In our public buildings, such as Westminster Abbey and the Temple Church we have these models of Creation accessible to all. At Hampton Court Palace may be seen on the pavement beautiful sections of the orthoceras. In the Midland Counties the chimney-pieces and floors are full of fossils, and become instructive museums. Your last book just published, "The Students Elements of Geology," has on the frontispiece three fossils characteristic of three important periods, and throughout its pages has information of the most useful kind; and I may add that the discovery of such interesting facts as I have mentioned has been greatly assisted by the publication of your works, which, when placed in the hands of the student, are a key to the great secrets of knowledge which the earth contains. For your many public services we are proud to enrol you a freeman of our company.

Sir C. LYELL, in reply, said: An allusion has been made to the very different feelings towards the science of geology which existed half a century ago, when I published my first work. I have good reason to remember the correspondence which I constantly had at that time with numbers of people who were greatly alarmed at the idea of believing that this globe was more than 5000 years old. And this had been affirmed by several lecturers at that time; by my friend Dr. Buckland in particular—the Rev. Dean Buckland—and had caused very great trouble and alarm. I am happy to say the time has come when there is so much

more freedom of opinion in this country, and fearlessness in avowing opinions, that there is no difficulty of the kind encountered by cultivators of geology. I have great reason to feel gratified by the compliment which has been paid to me in such eloquent terms to-day. (Hear, hear.) When I look at the list of distinguished men that you have already elected members of this guild, I can assure you that I highly appreciate the honour which you have done me, and, among other reasons, for the prizes which I see offered for public competition, and by the conferring of which you have done so much for the promotion of your branch of science. (Cheers.)

At the termination of the newly-elected member's speech, the addresses of Sir Charles Lyell, Prof. Tennant, and Mr. Jones were ordered to be entered upon the minutes, after which the proceedings came to a close.

FOREIGN MINES.

MALPASO GOLD WASHING.—C. R. Clarke, May 18: I wrote you last on April 28, since which we have been running day and night with a fair head of water until the 13th inst., when we began cleaning up. Our clean up gave us 145 amalgam, which retorted 56 ozs. 4 dwts. of gold. We now lack 200 ft. of being through the old wastes, and if Mr. Welton gives us water (which he promises on June 1) we will by August be washing all new dirt. Our banks still consist mostly of waste; the streak of blue cement (which I have described several times) lying up in the gravel has now become rather troublesome, as it now goes almost across the whole face, and it will require a great many peons to break it up as fast as it is caved down. The hard gravel underlying the machine, and through which we are carrying our sluice cuts, still shows dipping into the hill. Our banks are about 500 ft. ahead of the sluice, the gravel being carried by the water to the sluice through the cut in the hard gravel. I think our sluice will be on the bed-rock ere we reach the high banks with it. I shall add 40 or 50 ft. to the upper end of the sluice this week, and get everything in good order to make a long run, so that the banks may be reached as soon as possible. The general agent writes—"Medina Ditch: On the 12th inst. the ditch was finished, with the exception of three or four gates, and blasting a few rocks that were met with in excavating the channel of the ditch. Now the gates are the only delay to turning on the water, and these would have been finished but for the sawyers having left to go to the feasts. We have received great assistance from Mr. O'Reilly in the supply of tools for making the new ditch.—Malpaso Ditch: Up to the present a new ditch on the Cantarera stope has been considered almost impracticable, as it was stated that the ground was broken up by extensive workings, and consisted of a line of precipitous banks. Nothing, however, could be more wide of the facts of the case. I have now run the line for the new ditch, starting from a flume on the old ditch, a short distance above the point selected by Mr. Clarke for his bulkhead for the new main pipe, and carrying a ditch along the Cantarera slope, on the same glade as that of the Malabar ditch until I reached the Cantarera river. The total length of line was 13,713 ft., but the actual length would be about 15,000 ft., allowing for small bends not included in the line measures. The ground for the whole distance I found to be good, with the exception of some short pieces that were not worse than some portions of the ground on the line of the Malabar ditch. Very few flumes will be required, and the water can be taken from the Cantarera river without great expense. A very large flat exists near the head of the ditch, of about 50 acres in extent, that could be made into a reservoir if required; and in case of working the Pava Mine would serve splendidly as a deposit for the tailings from that mine. Finally, I am of opinion that a ditch can be made on the line run equal in every way to the ditch at Malabar. I left the men clearing the line of ditch of forest and brushwood, and since then the men who made the Medina ditch have been transferred to the Malpaso ditch. The new Malpaso ditch can, in my opinion, be completed in from six to eight months from this date to carry 1500 in. of water."

MALABAR GOLD WASHING.—May 7: The water is turned on about 1000 in. as far as the Andamios Gate, and from thence about 300 in. through the lower ditch to bulkhead, and through waste gate in bulkhead to mine. This is the first time that the Medina water has reached the mine.

May 8.—Water turned on 1000 in. through to the mine, but not through pipe.—Monitor and Distributors: All work about these finished. Water turned on to bulkhead 1000 in., of which some 200 in. ran down the pipe for the first time, and enabled us to stop leaks in pipe with sawdust. The pipe appears to be very well put together, and does not leak nearly so much as we anticipated. The whole rig appears to be excellently got up. We have not had the slightest hitch as yet.

May 9.—Washing began to-day. We turned on about 1200 inches of water, and run same through one 5½ inch nozzle, and one 4 inch. No. 1 monitor put to work opening grade; did excellent execution, and worked steadily all day.—Rocks, Stumps, and Roots: These will give us some trouble at first, until we get open. The roots especially are unavoidably numerous in opening ground which was a short time ago forest.—Ground Sluice: Heavy slides coming down all day, and running off through the sluice with the greatest facility. The cut is opening rapidly, and although the mass of clay between head of sluice and monitor is great there will be little difficulty in getting through it. One day's washing is sufficient to prove this.—Sluice runs admirably; put in a bank of quicksilver.—Gravel: Some rather good looking gravel has been uncovered before monitor No. 1. This is a matter of great importance, as it proves that the Spaniards did not work on pipe-clay as we supposed, but merely skimmed the top of the gravel as far as they could get grade without having to open a deep ground sluice (90 ft. at least), as we shall have to do. An enterprise of this sort was far beyond their capacity. We have great hope to find the gravel running deep, as the pipe clay appears to form the head of a channel. One day's washing, however, cannot show us much.

May 11.—Bulk head: Carpenters and Peons raising sides, so as to hold enough to fill the pipe without running over, and the rest of the Peons clearing ground-sluice of roots and stumps of trees. The water was turned on as far as the Andamios ravine.

May 12.—Ground Sluice: Peons clearing the roots and blasting a few boulders. As the cut—the result of one day's working—is still narrow, we have necessarily to stop running until the run is clear. As we open out these stoppages will be much less frequent, as there will be room for the Peons to work on one side of the pit whilst piping proceeds on the other.—Acequia: Some slight repairs are also being effected on one or two weak points in the ditch.

May 13.—Washing turned on from 1000 to 1500 metres of water. No. 1 monitor set to piping with 5½ in. nozzle, 235 ft. pressure. No. 2 monitor, 4 in. nozzle, throwing a fine stream, but not yet brought into action, as we shall have to run some days with No. 1 to open out. As the ground is easy to run, our single monitor, throwing as it does a most powerful stream of water, brings down all the stuff we can run, as at least twice as much ground is constantly caving in from the ground sluice as comes from the banks now opening. The appearance of the gravel in the cut now opening in front of Monitor No. 1 is all we can expect, and prospects very well indeed. We have at least 12 ft. of solid ground uncovered, and it appears to go down. The bank on the east side is about 38 ft. high, and on the west 15 ft. or 20 ft. A few more days' washing will give us more insight into the depth and extent of the deposit.—Ground Sluice: This is cutting its way up and deepening fast. All this work is done by water charged with tailings, which comes from the mine. Ran about nine hours, with some interruptions, in order to remove roots from the channel.

May 14.—Feast day Ascension: Turned on from 1000 to 1500 in. water, and although we had but two Peons who volunteered to work, we made as good a day's work as yesterday, piping all day with No. 1. Everything working most satisfactorily, and an immense mass of ground (a large portion of it unproductive) running off; ran 10 hours. To-day's work proves that we can get along occasionally almost without Peons. A feast-day need never prevent us running, unless there be some breakage in the ditch or machinery.—Outlet: It is now pretty well proved that the ravine will keep itself clear, a most important point, as without this we would soon be buried up with tailings. We feel quite easy on this head now. The Undercurrent will be put in at an early date.

May 15.—Mine: Owing to the accumulation of roots and trunks in the ground sluice, and a few large boulders, washing will be suspended to-day and to-morrow for the purpose of clearing out these obstacles. We would keep on running, but it would be pad policy to do so, the gravel accumulates on and over the roots, and renders difficult to work advantageously; as our cut widens rapidly, these interruptions will soon cease.

May 16.—Peons engaged cutting up roots and blasting boulders, and picking up some pieces of pipe-clay.

May 17.—Sunday Washing: Turned on 1200 to 1500 in., worked monitor No. 1, 5½ in. nozzle, did excellent execution all day, and we have now a large opening before us, in which we hope the Peons will be able to cut up roots without our having to suspend piping. Ran about nine hours. The gravel and banks look quite satisfactory.

May 18.—Mine: All our men engaged with clearing roots, rocks, and breaking up pipe-clay. No water turned on.

May 19.—Washing proceeding to-day at time of dispatching mail.

RICA GOLD WASHING.—N. S. Welton, May 16: I was at the mine on the 11th and 12th inst., and the water account for the previous 14 days showed an average of six hours' work per day, but Messrs. Skinner and King informed me that twelve hours' work per day would have been done during most of the time but for constant breakages on the ditch. The mine is now so opened out that a good view of the gravel can be obtained, and the bank looks much better than I have ever seen it. The bed rock appears to be much cracked, and heaved up in parts, but it still dips north-east. I resolved to take advantage of the favourable weather, and not clean up till the end of this month; the result of this clean up will be very important, as it will be the first run during which anything like work has been done. I observed the manner in which the gravel washed, and a piece of the bank that had slid down, and the bulk of which could be easily estimated, and which (taking it at the lowest estimate of three calculations made by myself and Messrs. Skinner and King) contained 8000 cubic feet was completely washed down the sluice in less than two hours. From my observation of the washing of the Malpaso gravel I am quite certain that a constant supply of 200 inches of water at Rica would wash more gravel than 700 in. would at Malpaso.

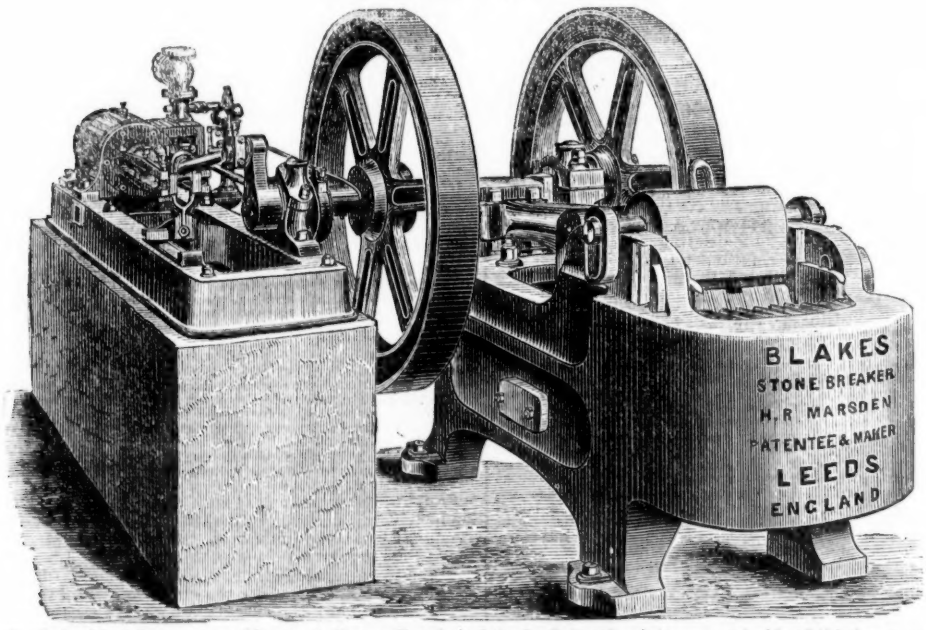
[For remainder of Foreign Mines see to-day's Journal.]

MINING IN UTAH.—The Emma is now employing 115 men, and things look lively about the mine. The concentrators are in full blast, and work nicely. The ore is taken at the dump and shoveled through coarse screens or sieves. The coarse pieces that will not pass through are sorted, and the ore sacked. All that passes through is shoveled into an incline slummer, with a bottom of different sized screens, where two water-pipes play on the ore as it passes through the slummer, and all the fine ore and sand that pass through the upper and finest screen goes into a spout, in which a stream of water is running, and is carried down the hill one-fourth of a mile to the lower works. The remainder, which passes through the lower screens, is taken from boxes where it is received, and passed through jiggers, where it receives a thorough stirring and shaking, and the ore being heavier than the waste the most of it settles to the bottom. The top is taken off, and looked carefully over, and all pieces of ore that are left are sorted out and sacked. All fine ore is run into spouts, and carried by the water to the lower works, which consist of a series of sluice-boxes similar to those used in the placer mines. The waste is run off to the dump, and the ore sacked ready for shipment. It is the intention of the managers of the mine to soon erect a crusher at the mine, where the ore will be crushed to a suitable size to go into the jiggers, and thus avoid the necessity of running through the first set of screens. The concentrators have a capacity of turning out 25 tons daily, or 75 tons as it comes from the mine. Said ore is worth from $75 to $85 per ton after it has passed through the above process.—To London Readers: I will here say for the benefit of "Sinex" and the London readers of the *Tribune*, that all the machinery in connection with the concentrators was built last season, and run four months, and after paying all expenses (building and machinery included) left a net profit to the company of $60,000 for the four months' run. For proof I refer him to the report for 1873, issued to the stockholders from the Emma office in London. So much for the profit of working the second-class ore. As to the other questions—Whether this second-class ore stands in reserve of ground connected with high-grade ore or otherwise, and whether the present daily shipments of high-grade ore come from the bottom of the mine, these questions have nothing to do with my first statement; namely, that the Emma would ship heavily this season. I will respectfully refer "Sinex" to Mr. Hannibal Williams, superintendent of said mine, for the information he seeks.—*Salt Lake Daily Tribune*, June 10.

DESCRIPTION OF A

NEW COMBINED STONE-BREAKER AND STEAM-ENGINE.

BY H. R. MARSDEN, PATENTEE.



The machine is of the kind known as "Marsden's Patent Toggle Lever Machine," and is of a size to admit a stone whose end section would measure 20 in. by 9 in. The framework is in one casting of considerable strength and weight, and has two arms carried in the rear of the machine, in which are inserted adjustable gun-metal bearings, in which is carried the crank-shaft. This shaft is of the best selected scrap-iron forged solid and slotted out. A long end is left on the engine side, upon which at opposite centres is keyed the engine-crank or disc. Two objects are secured by this arrangement:—1. The weight of the moving parts of the engine act as counter-weights or balances to those of the machine; and 2. To place the crank of the engine in its most favourable position as regards power, to overcome the point of greatest resistance in the machine, which always occurs when the lever stands in its vertical position; thus, when the piston is about the middle of its stroke the lever assumes the position named. The blow is struck with the greatest force the engine is capable of exerting, and at a time when the velocities of all moving parts are at the highest.

The operation of Crushing or Breaking may be briefly described as consisting of a swinging jaw fitted with a renewable face of chilled cast-iron operating against a similar jaw fixed (but reversible) in the main frame at the end. Movement is given to the swinging jaw by means of a vertical lever, mounted on a stud, and capable not only of oscillating therein, but capable of a forward and backward movement by reason of the alteration in the angularity of the back toggle plate; on each side of this lever, and in the same plane as the stud, are two notches into which the toggle plates press, the back one resting in a casting at the rear of the machine, whilst the front one rests in a notch in the swing jaw. By the oscillation of the lever, operated by the crank through a strong connecting-rod, the jaw is caused to approach and recede from the fixed jaw twice for each revolution of the crank, or one nip for every time the lever stands in a vertical position.

As piston speed was necessarily limited, some contrivance was absolutely necessary to apply a direct-acting steam-engine without belt, gearing, or countershaft; this has been most satisfactorily accomplished, and large numbers are being made on this plan. The engine has one cylinder 11 in. in diameter by 20 in. stroke, is very substantial in appearance, and has a separate eccentric to work the expansion valve. The cut-off point can be regulated by a hand-wheel at the back, whilst the engine is moving from ⅛ to ½ stroke, to suit either high or low pressures of steam. The speed of the engine is 125 revolutions per minute, and every part is designed to suit this speed; large wearing surface and ample means of adjustment, two massive fly-wheels are provided, and the whole well and substantially put together; with 40 lbs. of steam the combined machine would break down, suitable for road metal, from 100 to 130 tons of furnace slag per day of 10 hours, at a cost of 3d. per ton.

The machine is fitted with H. R. Marsden's New Patent Cubing Jaws, and will be shown in operation throughout the duration of the show of the Royal Agricultural Society at Bedford.

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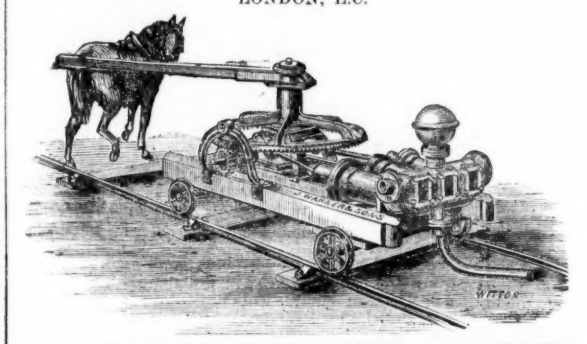

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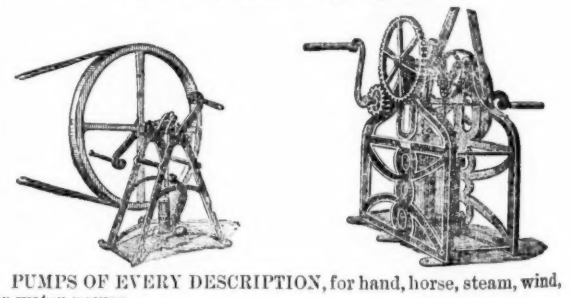

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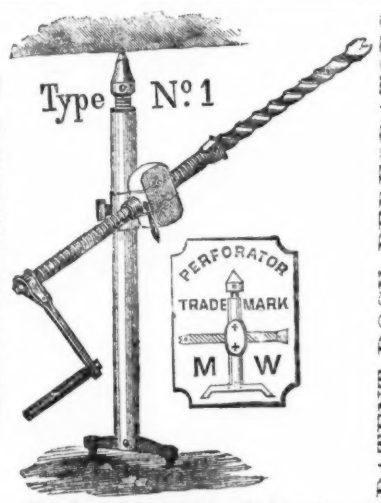

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This is the best hand-worked implement for colliery purposes extant. It can be carried about, set up, taken down, and worked by one man. It bores vertically upward as well as in any other direction. The rate of work is at least four times as great as by the usual methods. The hole made is straight and uniform, and, therefore, specially adapted for the use of cartridges.

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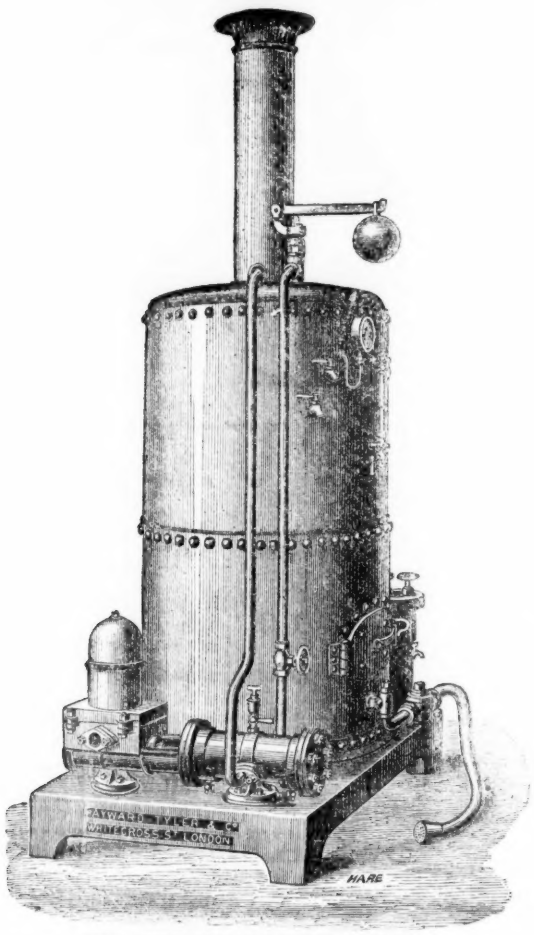
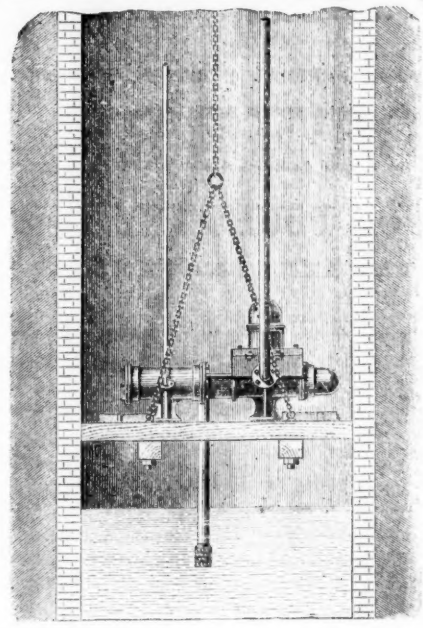


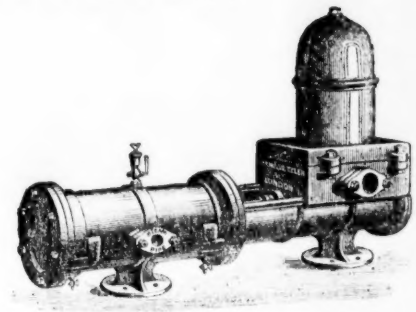
THE "UNIVERSAL," WITH BOILER.

"Important to buyers of this Steam Pump is a specimen of one of the steam valves, shown after working for more than two years. It is without any wear, without even a scratch, and the marks of the tool can be seen."—*Engineer*, Dec. 13, 1872.



SHOWING THE "UNIVERSAL" SLUNG IN "DROWNED-OUT" PITS.

NO TAPPET VALVES.



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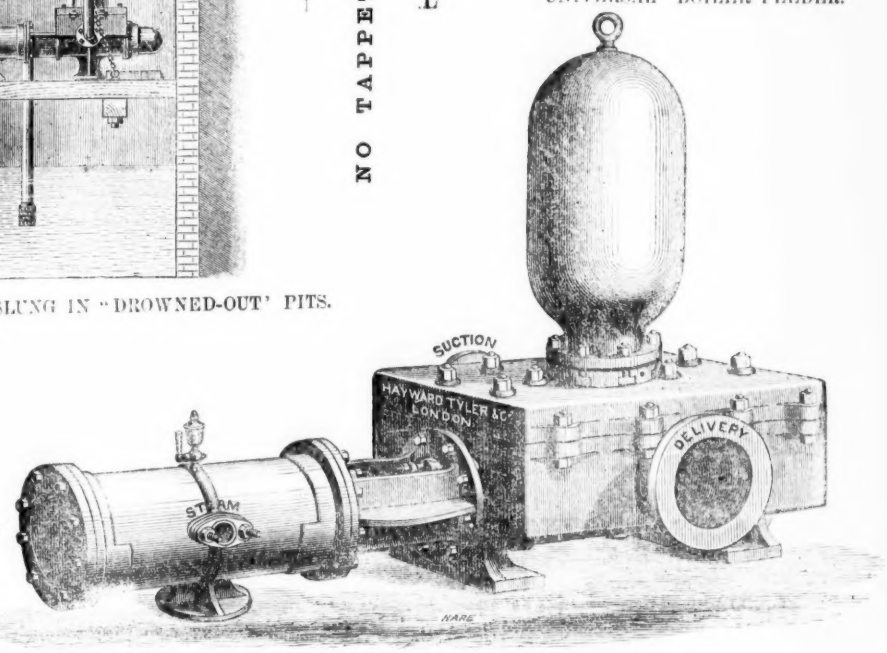
"It is a fact that, although there are a variety of Direct-acting Steam Pumps in the Exhibition, none that we have noticed works so quietly."—*Engineer*, Aug. 1, 1873.



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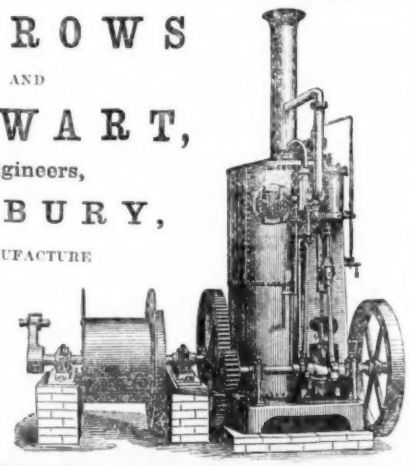

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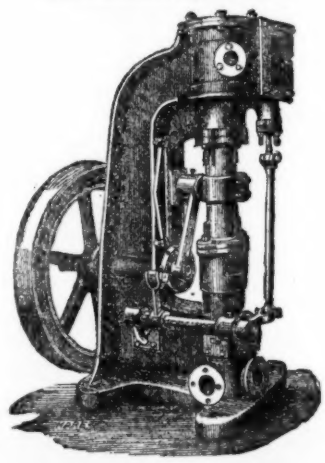

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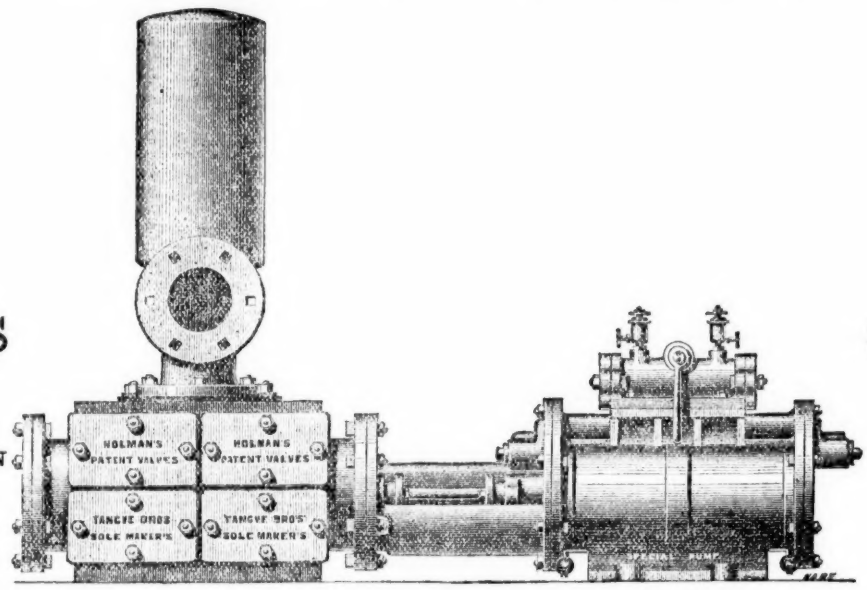

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Length of Stroke ....Inches	9	9	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Gallons per hour	680	815	1830	3250	1830	3250	5070	1830	3250	5070	7330	1830	3250	5070	7330	9750	3250	5070
Price ....£	16	18	20	25	22 10	27 10	32 10	25	30	35	40	30	35	40	45	50	40	45

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Diameter of Steam Cylinder....Inches	8	8	8	9	9	9	9	9	10	10	10	10	10	10	12	12	12	12
Diameter of Water Cylinder....Inches	6	7	8	5	6	7	8	9	5	6	7	8	9	10	6	7	8	9
Length of Stroke....Inches	12	12	18	12	12	12	18	24	12	12	12	18	24	24	18	18	18	24
Gallons per hour....	7330	9750	13,000	5070	7330	9750	13,000	16,519	5070	7330	9750	13,000	16,519	20,000	7330	9750	13,000	16,519
Price ....£	50	55	65	50	55	60	70	85	55	60	65	75	90	100	75	80	85	110

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Diameter of Steam Cylinder....Inches	12	12	14	14	14	14	14	14	16	16	16	16	16	18	18	18	18
Diameter of Water Cylinder....Inches	10	12	7	8	9	10	12	14	8	9	10	12	14	9	10	12	14
Length of Stroke....Inches	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Gallons per hour....	20,000	30,000	9750	13,000	16,519	20,000	30,000	40,000	13,000	16,519	20,000	30,000	40,000	16,519	20,000	30,000	40,000
Price ....£	120	140	110	120	130	140	160	180	140	150	160	180	200	190	200	220	240

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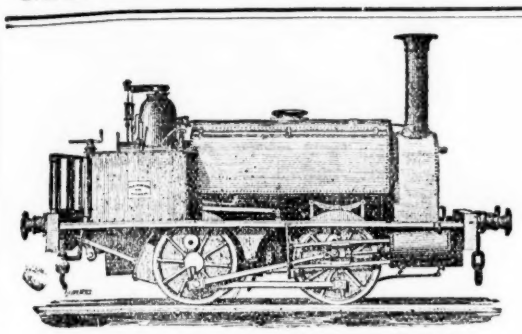

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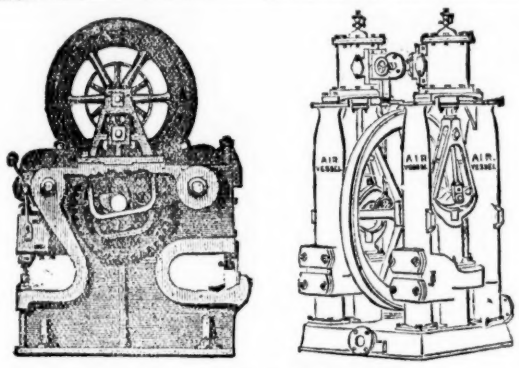

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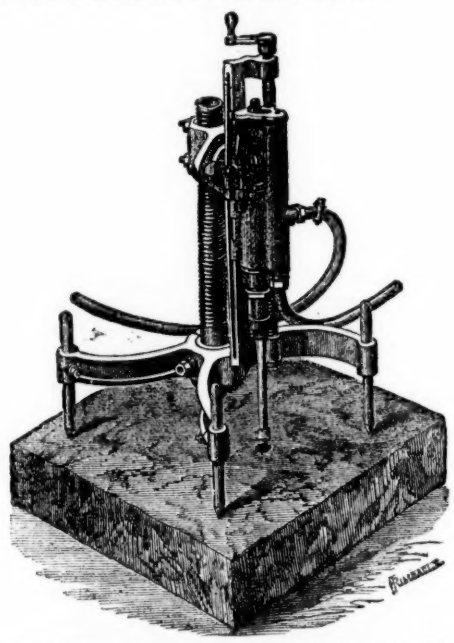

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Draycott Hall, Richmond, Yorkshire, May 11, 1874.

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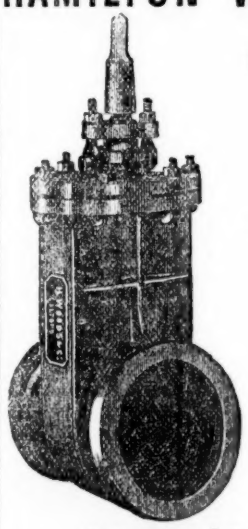

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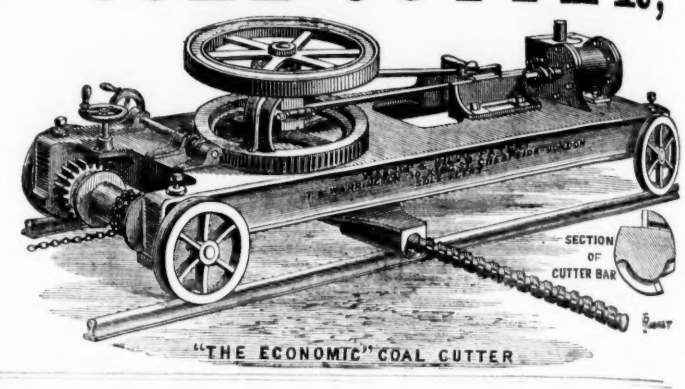

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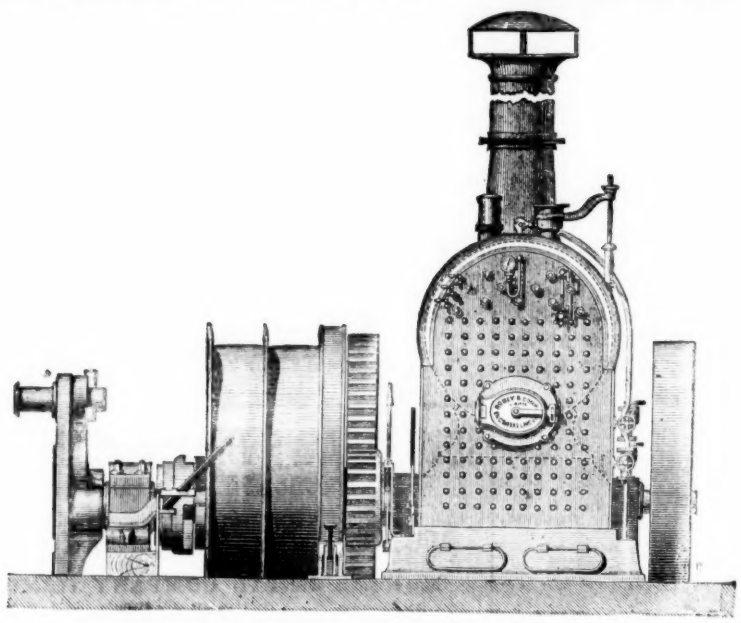

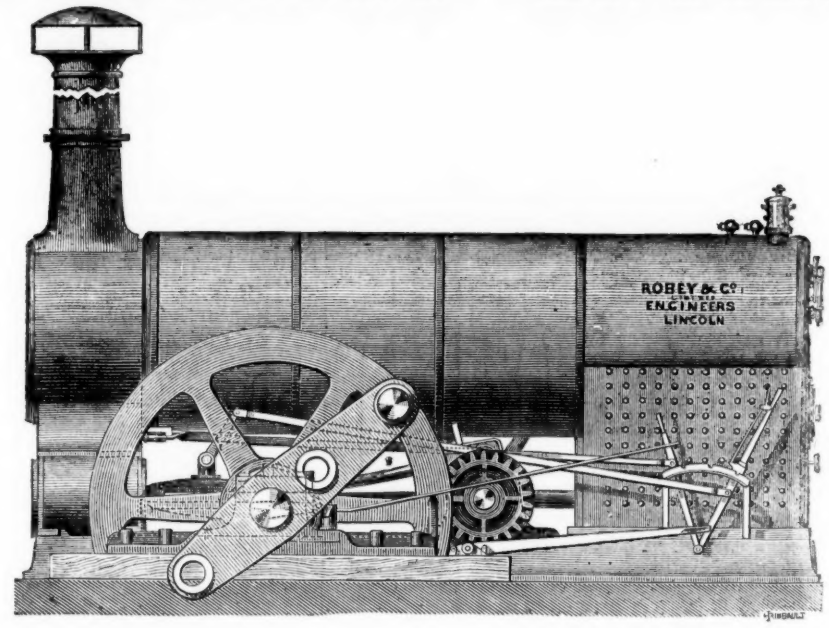

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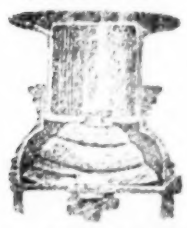

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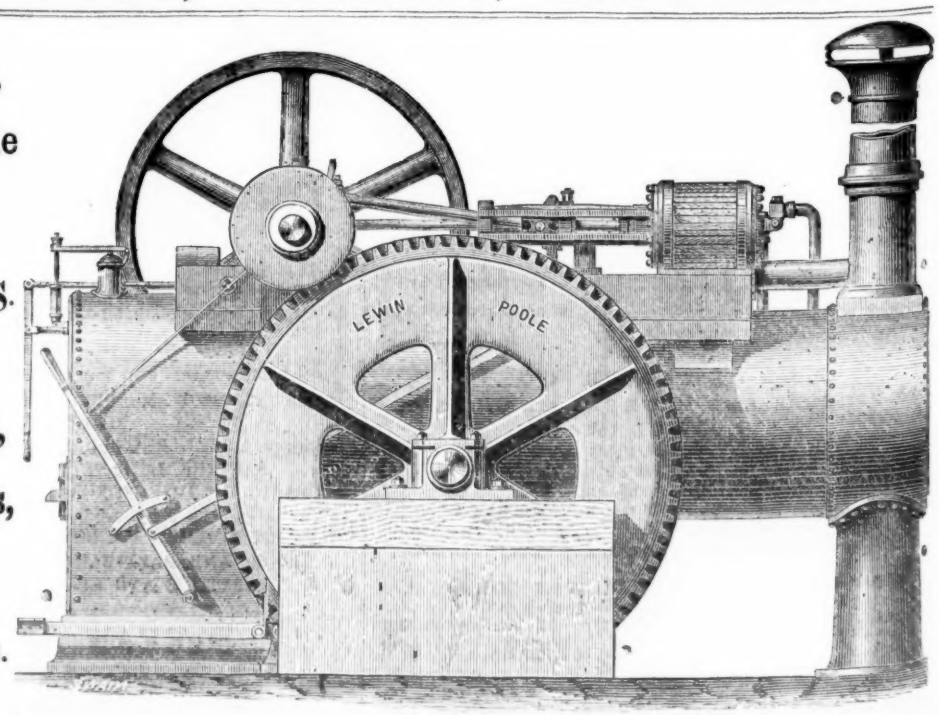

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THE IRON AND COAL KINGS OF THE NORTH.

No. I.—SIR GEORGE ELLIOT, BART.

The latest Baronet created by Her Majesty's Prime Minister, Sir George Elliot, is in some respects the most distinguished recipient of that honour. It has not been given to him to achieve victories upon the "tented field," to excel in the arts of diplomacy, to take rank as a great orator, or to sway the impulses of the multitude by the power of the pen. But in his own way Sir George has achieved many of those peaceful victories "not less renowned than those of war." To the science of mining he has contributed many valuable additions. As a mining engineer he stands almost without a rival in his own northern county; and as an enterprising and successful capitalist he has made a name that will not readily perish.

Sir George Elliot was born at Gateshead, on March 18, 1815. His father was employed as an ordinary workman at one of the collieries adjacent to that town; and when he came to an age when he could assist in winning the family's bread he obtained employment "down the pit," thus commencing life on one of the lowest rungs of the ladder. But the boy early exhibited proofs that he was "father to the man." His early education was very limited, and when opportunity offered he determined to educate himself. At the age of 17 he commenced the study of mathematics; and shortly afterwards, by his own request, he was allowed to withdraw from the pit, and enter the service of a surveyor in his native town. In his 21st year he was appointed as colliery overman, and in the following year he was made underviewer at Monkwearmouth Colliery—then one of the largest and most important collieries in the North of England. At Monkwearmouth he distinguished himself by assiduity and skill, to such an extent that he was soon made chief viewer of the colliery. In this capacity he became well known to most of the leading colliery owners of the North, and as his prudence and experience were tolerably well known he was often consulted in matters pertaining to colliery management and extension. Among others, Messrs. Backhouse and Mounsey, two Sunderland capitalists, sought his advice as to the purchase of Washington Colliery, then in the market, from Mr. Russel, of Brancepeth Castle. He not only recommended the purchase, but backed up his recommendation by offering to take an equal number of shares. This was his first step in the direction of becoming a colliery owner, and it proved a very well-advised and excellent purchase. Some years later Mr. Elliot leased the Usworth Collieries, near Newcastle, then in a very unprosperous condition; but by the judicious expenditure of capital he was enabled to make them one of the finest properties of the kind in the North of England.

In 1851 Mr. Elliot gave up his appointment of head viewer of the Monkwearmouth Collieries, and accepted the place of chief mining engineer to the Marquis of Londonderry. His lordship was not only one of the largest mineral owners in North Durham, but he owned then, as he owns still, very large and important collieries in the neighbourhood of Seaham Harbour, a port near to Sunderland, which has almost entirely sprung into existence within the last 20 years, and the development of which is no small degree owing to Mr. Elliot's exertions. In his new capacity, therefore, he had immense responsibility resting upon him; but he gained, and continued to hold to the last, the confidence and esteem of his noble employer, whose collieries in his hands became largely developed, and a source of immense income to their possessor.

Although he continued to act as mining engineer to the Londonderry family, Mr. Elliot gradually improved his own properties, until he became one of the largest colliery owners in the kingdom. In 1863 he became the owner of Penshaw Colliery, where he had been employed as a pit boy 35 years previously. Since then he has acquired the Powell's Duffryn, Aberaman, and Cwm Noel Collieries, in South Wales, and an interest in colliery properties in other parts of the country. In the North of England the largest property acquired by him is undoubtedly the Usworth Collieries, which are situated near Washington, and within 12 miles of Newcastle-on-Tyne, which is the shipping port from whence their produce is dispatched to all parts of the world.

The coal raised at the Usworth Collieries is of two kinds—gas and steam coal. The Low Main coal is specially adapted for steam-raising purposes, and is greatly in request therefor. The coal raised from the Maudlin and Hutton seams is used for gas making, and a large quantity, averaging 500 to 600 tons per day, is sent to London, to be used in the gasworks of the metropolis. The Usworth Colliery has three shafts. One of these is the downcast, 12 ft. diameter; another is the upcast, 10 ft, diameter; and the third is the air pit, sunk at a distance of fully 50 yards from either of the other two. In connection with the latter shaft a Guibal fan is in operation, 45 ft. diameter and 12 ft. in width. This fan works at the rate of 45 revolutions per minute, and circulates from 200,000 to 250,000 cubic feet of air per minute. It is worked by two engines, each having a 36-in. cylinder and a 3-ft. stroke, and working directly to the shaft and the fan. Sir George Elliot was one of the first to see and recommend the advantage of mechanical over the old system of furnace ventilation, and his example in the introduction of the Guibal fan has been largely followed by other colliery owners in the North. There are three principal seams worked at Usworth—the Hutton, the Maudlin, and the Low Main. The Maudlin and the Hutton seams are worked on the bord and pillar system, while the Low Main seam is worked on the plan of long wall. The dip of the measures varies from 3 in. to 5 in. per yard. In all the seams the cleavage runs nearly north and south, the principal workings being driven at right angles to to this inclination. The underground workings are very extensive—so much so as fully to justify the remark made by the owner in giving evidence before the committee appointed to enquire into the probable extent and duration of our coal supplies, when he said that it was almost possible to get underground from Durham to Newcastle—a distance of nearly 20 miles. The coal is won at a depth of 200 yards from the surface. The gross daily produce of the Usworth Colliery is about 1500 tons, or close on 10,000 tons per week, of which large quantities about 700 tons per day are raised from the Low Main, 170 fathoms in depth, and from 500 to 550 tons per day from the Hutton seam, 200 yards in depth. Over a thousand men and boys are employed in connection with the colliery. The machinery is all of a high class, and chiefly made by Messrs. Black, Hawthorn, and Co., of Gateshead. A notable speciality of the workings is the adaptation of all the main roads for engine-power, the yield of the different seams being brought out by an engine plane carried through the Low Main seam, and connected with the other two seams by rise drifts which serve as self-acting machines.

Sir George has not only recommended but he has also designed mechanical appliances calculated to improve the science of mining and the health and safety of the miner. One of his inventions (described in the *Mining Journal*, of Nov. 5, 1870) has been adopted in not a few cases for the better ventilation of mines, and is also applicable to the ventilation of ships and public buildings. But it is more especially on the subject of the internal workings of the Durham and South Wales collieries that Sir George has come to be regarded as an authority. At his collieries at Cwm Noel, at Upper and Lower Duffryn in South Wales, and in Durham he has made a series of elaborate and careful experiments with the view of testing the effects of the external air upon the internal temperature of a colliery, and ascertaining how far it is possible to modify the inimical conditions to deep coal working. As a result of these experiments, he has found that the increase of temperature in a mine is determined by the depth from the surface, and has no reference to the depth below the level of the sea; that under all conditions there is a steady increase of something like 1° for every 60 feet of descent; that the increase of temperature must be counteracted by increasing the quantity of air; and that improved ventilation would enable a miner to do his work at a higher temperature for the same remuneration as he now receives. He has also arrived at the conclusion that the use of air machines will entirely supersede the use of horses underground, although he does not expect much relief from the use of coal-cutting machinery. All these, and other not less valuable conclusions, were stated by Sir George to the committee appointed to enquire into the probable extent and duration of our coal fields, and his evidence was esteemed more valuable and important than that of almost any other witness, seeing that the range of his experience was so large and ample. In the Coal Commission of 1873 Sir George also found a place, and here, again, he exhibited a vast acquaintance with all matters pertaining to mining engineering.

In 1849 Sir George entered into partnership with Sir Richard Glass, as a telegraph cable and wire-rope manufacturer. As many of our readers will be aware, the firm of Glass, Elliot, and Co. has manufactured not only the Atlantic Cable, but the Franco-American, the British Indian, and the British Australian cables. Indeed, there is no telegraph cable laid of any consequence in which they have not been more or less concerned.

We cannot deal here with Mr. Elliot's parliamentary career, although we may be permitted to remark that while he was in the House of Commons, between 1868 and 1873, no one did more to forward the interests of mining, and to put the Mines Regulation Act on a just and sound basis.

In the general election of 1874 Sir George Elliot lost his seat, but subsequently Messrs. Bell and Palmer, the candidates then elected, were unseated on petition, and a fresh election became necessary. This second election resulted last week in again placing Sir George in the House of Commons, where the mining and manufacturing interests of his country may expect that he will continue to render the same yeoman service in the future that he has done in the past.

THE LIFE AND LABOURS OF ARTHUR WOOLF, THE INVENTIVE CORNISH ENGINEER.

An interesting paper, "On the Life and Labours of ARTHUR WOOLF, of Camborne," by Mr. S. HOCKING, C.E., of Lower Rosewarne, near that place, his nephew and pupil, was read by Mr. J. H. COLLINS, F.G.S., the honorary secretary of the Miners' Association of Cornwall and Devon, at its quarterly meeting, which was held in the large museum of the Royal Cornwall Geological Society's building, at Penzance, on Tuesday last. The following is an outline of the paper:—

Woolf's biography has not yet been written, and he is, therefore, less known to Cornishmen than some of his contemporaries, although he conferred substantial benefits on his native country and the world in general by his improvements in the steam-engine. He was baptized at Camborne Nov. 4, 1766, his father Arthur Woolf, being a tal carpenter. The future engineer was bound apprentice to a carpenter and joiner, at Pool. Having served out his indentures he removed to London, and soon obtained employment as a millwright, which led to a situation as first-class man at Bramah's celebrated engineering works at Pimlico, where the talented Henry Maudslay was his fellow-workman. Together they left Bramah's, each to start as an engineer on his own accounnt. In 1796 a Durham colliery owner employed Woolf to erect a second-hand Bolton and Watt engine at Newbottle, on the condition that he was to make it consume less fuel. This he successfully accomplished, his early familiarity with Cornish steam-engines having added to his fitness for such an undertaking. Having the next year assisted Hornblower over a difficulty with his two-cylinder engine at Meux's London Brewery, he was appointed resident engineer, and held the situation for nine years. In the year 1806 he started, with a Mr. Edwards, a steam-engine factory on his own account. While at Meux's brewery he patented a cast-iron boiler to resist high-pressure steam. The brewery books show that he was resident engineer there from April, 1797, to October, 1806—dates which are relied on to correct an influential statement that he was a workman of Trevethick's, and sent to London with one of that Cornishman's high-pressure engines, and was, as late as 1803, paid by Trevithick at the rate of 30*s.* a year. Woolf was not in the country at that time, and was paid 3*l.* a week by Messrs. Meux and Co. In 1804 he patented his mode of working high-pressure steam, and Watts's condensor to Hornblower's two-cylinder engine. With one of these, a 36-horse power, he did the work of the brewery, consuming 34 bushels of coal per day. After he left, a 30-horse power Bolton and Watt replaced his engine. To effect the same amount per diem it consumed 84 bushels of coal. In a subsequent corn-grinding test before Trevethick, Penn, and Henry Harvey, Woolf's engine ground above 17 bushels of wheat for each bushel of coals consumed; while a Bolton and Watt ground not quite six bushels of wheat for each bushel of coal; or 36,000,000 to 40,000,000 of duty to 12,000,000 or 13,000,000. In 1812 Woolf returned to Cornwall. His partner established himself in France as a maker of Woolf's engines and boilers. The boiler is still the type of those in general use in France, and, Mr. Hocking adds, "Ought to be better known in England."

Stamping of ores by steam-power was first introduced by Woolf; he erected one of his patent engines for that purpose at Wheal Fanny, now the Carn Brea Mine, in 1813-14, afterwards in several other mines. The large-size pumping-engines erected at the Wheal Abraham and the Wheal Vor in 1814 and 1815, successfully proved the value of Woolf's inventions and established his reputation as the ablest of Cornish engineers. The very great advance he made in the duty done by a bushel of coal, raising it from about 2,000,000 to 50,000,000, served to stimulate other engineers, as will be seen from the following quotation from an article on the History of the Cornish Engine, by James Sims, C.E., published in the "Mining Almanack" for 1849. "I commenced engineering," says M. Sims, "in the year 1811, at a period when the steam-engine was in a very rude state, and from that time up to 1814 little or no improvement took place." The average was for 1812, 19·3 millions; for 1813, 19·5 millions; and 1814, 20·6 millions. In the latter part of 1814 Mr. Arthur Woolf erected one of his patent combined cylinder engines, and with great success. The duty of Woolf's engine having risen to 52·3 millions of pounds lifted one foot high by the consumption of one bushel of coal; and he having made several important improvements in Boulton and Watt engines, by causing them to work more expansively, by using higher pressure steam, awaked the whole of the Cornish engineers to a new era in steam-power. This statement must be considered highly complimentary to the abilities of Woolf, coming, as it does, from one of his most active opponents in engineering practice in Cornwall. Early in the year 1815 Woolf was employed by the managers of Dolcoath Mine to report upon the efficiency of the steam-boilers belonging to their large engine. As there was a difficulty in getting steam from them in sufficient quantity to meet the requirements of the engine, which was getting heavier loaded as the mine deepened. He found the boilers of ample capacity, and coal enough consumed to give the necessary quantity of steam; and the fact of their not doing so was proof to him that much of the heat was escaping to the chimney, which on examination he found was the fact. He simply removed the outlet passage to the chimney from the highest part of the flue to the lowest, when it was found the steam-giving power of the boilers under the altered condition had so increased as to render it unnecessary to add the contemplated new boiler.

Dolcoath new engine, erected by Jeffrey and Gribble in 1816, has often been referred to to show how near other engineers, using single cylinders (Boulton and Watt) form, approached the duty done by Woolf's two-cylinder engines. Woolf found in Gribble one of the most promising young men for his profession he met with in Cornwall, and ever felt a pleasure in assisting him. Every drawing for the construction of the said Dolcoath new engine was by Gribble submitted to Woolf, as his personal friend, for approval, &c. Hence the complete success of this engine, for it was constructed in conformity with Woolf's patent, dated June 7, 1804, wherein a portion of his specification reads as follows:—"Fifthly, with regard to steam-engines in which the separate steam measure may not be thought advisable, the same may be improved by the application of my aforesaid discovery—by making the boiler and steam-case in which the cylinder is enclosed much stronger than usual, and by altering the structure and dimensions of the valve admitting steam from the boiler into the cylinder in such a manner as that the steam may be admitted very gradually at first, afterwards more freely. The reason for this precaution is this—steam of such great elastic force as I employ, if admitted suddenly into the cylind·r, would strike with a force that would endanger the safety and durability of the engine. Due and effective means must be used to keep up the requisite temperature of all the parts of the apparatus into which the steam is admitted, not intended to be condensed." At the time Woolf commenced his practice in Cornwall there was no engine manufactory in the county that could supply such large castings as he required; they had to be brought from Wales, and were fitted up on the mines where they were to be employed. Most of the wrought ironwork was forged, as well as fitted also, on the mines. Woolf had to train a staff of skilled workmen, selected from the most intelligent youths of the day. He was himself a first-class worker in metal and in wood, and was admirably endowed with qualities as a teacher. He constructed a good assortment of machine and hand tools, and worked them himself, with the help of his young men, until he could safely trust the tools in their hands.

Thus, in the Wheal Abraham commenced the school of mechanics that has since furnished Cornwall and many other countries with skilled workmen and engineers. Seeing the need of a good engine manufactory in Cornwall, Mr. Woolf first thought of establishing one himself, but was persuaded by Messrs. Harvey and Co., of Hayle, to forego such intention, and give that company the benefit of his knowledge in the enlargement of their little growing establishment, so as to make it serve his purpose. This work he undertook to do, and became the superintendent of the establishment; and this office he held up to the time of his retirement, in 1833. The considerable reputation acquired by Messrs. Harvey and Co. up to that date was mainly due to the labours of Mr. Woolf.

Mr. Woolf said, on being complimented in public company on his success in raising the duty from 20,000,000 to 52,000,000, that what he had done in that direction was but the starting point in progress, that some of the boys he had in training would make the steam-engine do 100,000,000, which prophesy has been realised. Of Mr. Woolf's ability as engineer and teacher of mechanics no man had better opportunities of judging than Mr. John Taylor, the able manager of the Consolidated and United Mines, in Gwennap; from whose statement, published in the work on Cornish Engines, by Mr. Pole, the following extract is taken:—"He (Mr. Woolf) made many valuable alterations in the details, among which may be mentioned the remodelling of Mr. Hornblower's double-beat valve into the present improved form, introduced a style of manufacture greatly superior to any that had been before known in the county, and formed, in fact, a new school of engineering there. He seemed to possess an almost inexhaustible mine of invention. His improvements in detail were almost ennumerable, for scarcely a single part of the engine could be named, however apparently unimportant, which did not receive some beneficial alterations at his hands. His talent for contriving tools was very great, and he seemed to have almost an intuitive perception of the best methods of performing operations and processes of all kinds."

In the limited space allowed for this paper a bare list of Mr. Woolf's variousengineering labours cannot be given. There is, however, one little machine he erected in Messrs. Bolitho's tan yard, in 1828, if working still would be a fit subject for description by a Penzance pupil for next year's report. It consists of pumps to drain the tan-pits, worked by a power at a distance, communicated through a column of water in a close pipe.

Mr. COLLINS remarked that one of the reasons why Woolf's labours were not better appreciated in Cornwall was that his inventions very largely consisted of improvements in detail. He made possible some of almost the wildest speculations of his neighbours by introducing perfect workmanship and by modifying details, so that one thing did not clash with the other. It was not so much that he introduced entirely new things as that he carried them out to a successful issue. If they examined the Cornish pumping engine of the very best construction at the present time they would find it full of small improvements, as they might seem, taken one at a time, but which in the main made that 100,000,000 of duty possible when Woolf himself only looked for a duty of 52,000,000. The man who does many small things is a greater benefactor to his species than he who strikes out an entirely new path, but does not know how to follow it up. (Hear.)

Thanks were voted to Mr. Hocking for his paper.

*** In the Supplement to next week's Journal we shall publish the interesting letter from Mr. Charles Fox on Practical and Scientific Suggestions as to the Present and the Future of Cornish Mining, with the discussion thereon.

THE IRON DEPOSITS OF CORNWALL.

Permanent advantage will probably accrue to Cornwall from the recent depression in the tin and copper trades owing to the attention which it has caused to be directed to the iron deposits. It appears, says Mr. J. H. COLLINS, F.G.S., in a paper recently read by him before the Miners' Association of Cornwall and Devon, on "The Great Perran Iron Lode," to be characteristic of Cornwall to have great faith in its existing works and industries, but very little in those which are as yet undeveloped. The former neglect of copper and china-clay is referred to, and he thinks that the instances given are precisely paralleled in the present condition of iron mining in Cornwall. Nearly 40 years ago, with reference to the now well-known Perran lode, Mr. W. Jory Henwood wrote—"At the eastern extremity of Ligger Bay is a large vein bearing S.E., N.W., and dipping south 50°; it contains hematite, specular and earthy brown iron ore, quartz, and slate, has many cavities lined with crystals of quartz, and is traversed by many small quartz veins. Sir H. Delabeche, in 1839, wrote that there could be little doubt that a large supply of good hematite iron ore could be readily obtained from Cornwall and Devon if the necessary demand existed." No truer description, continues Mr. Collins, of the Perran lode than that given by Mr. Henwood could be given now in the same number of words, yet among the miners of Cornwall some do not believe there is any considerable quantity of iron ore there or in the county. Others doubt as to the quality—nearly all assert that it cannot be worked at a profit. I believe that these are all wrong, that the quantity is enormous, the quality mostly all that can be desired, and that very large profits are to be made by working the ores.

Iron ore in Cornwall almost always occurs in lodes, and these are very numerous, and often astonishingly persistent. Many are known to extend for several miles in a direct line, and the depth to which the ore holds down is quite unknown. In many respects, however, the Perran lode differs from most of the others, especially in direction, size, underlie, and in the nature of its contents. The Cornish iron lodes have usually a direction a few degrees west of north—average, perhaps, 3 to 4 ft. wide, underlie about 1 ft. in a fathom, and contain either red or brown hematite. Many of them are, in fact, the cross-courses of their respective districts. On the other hand, the Perran lode bears about 35° N. of W., averages perhaps 30 feet in width for a course of several miles, underlies from 3 to 4 ft. in a fathom, and contains large quantities of carbonate of iron or spathose iron ore. It is first seen in the cliff, as stated by Mr. Henwood, and here it is above 100 ft. wide, consisting of two great branches, divided by a horse of killas; from here it may be easily traced inland for a distance of four miles to Deer Park, where it takes a turn—at first directly east, and afterwards some degrees N. of E., so proceeding in a curve as far, it is said, as Grampound, a distance of about 12 miles. It is, however, of little value so far as is yet known after the first four miles, and it is to this portion, therefore, that Mr. Collins directs his attention.

This great lode has been partially worked at intervals for about 20 years, and in that time, perhaps, 200,000 tons of ore—certainly not more—have been taken out and sold. The cost of carriage rendered the working of the mineral unremunerative; but the quality seems to have been satisfactory, for Mr. Menelaus, of Dowlais, was "much pleased" with 40,000 tons supplied to him in 1865; and Mr. Henry Bessemer visited the mines about the same time, and pronounced the ore to be specially adapted for his process of steel making. At present the lode is being vigorously worked by the Cornish Consolidated Iron Mines Corporation, and recently a railway connecting the mines with the fine natural ports of Fowey and Falmouth on the south coast, and passing through some of the finest mineral districts in the world, is now being constructed. With regard to the present state of the works on the great iron lode, Mr. Collins states that at the cliff itself, upwards of 180 ft high, where the lode divides into two, two large gangs of men are daily engaged in quarrying brown hematite of excellent quality. The old adit here has been straightened, extended, and widened to allow of the use of tram wagons, and a shaft has been sunk inland—No. 1 shaft—communicating with it and ventilating it. In the adit men are now stoping ore at three different points, and tramming it out to add to the large piles outside. At this point the Huel Golden lead lodes cross the iron lode, and some fine stones of lead have been already broken in the iron ore. A little further inland a fine shaft, known as Borlase's, has been sunk about 15 fms., and a level driven to communicate with a large excavation (the Big Iron Pit) on the south branch of the lode. Several other trial shafts have been sunk still further inland, all of which prove the continuity, size, and value of the lode. Of course, there are variations in width and mineral character, and the lode does not follow a perfectly straight course, but it is everywhere a fine lode; this part of the sett is called Gravel Hill; it was formerly known as the Penhale Iron Mine.

To the eastward of these first workings in the Gravel Hill sett the Halwyn sett occurs, and this is also held by the same corporation, and has been proved by them most satisfactorily. A vertical shaft has now been commenced on this part of the property. The Halwyn sett is bounded on the east by the Mount Mine, where very fair ore is now being raised for shipment at Truro; the on y machinery here is a horse-whim, by which the ore is raised from a depth of more than 20 fms. No doubt both output and appliances will be much improved as soon as the railway is open for traffic. Still further east the two great excavations at Treamble are situated; here may be seen large parties of men constantly breaking down brown hematite and white spathose iron ore in rocks, each of several tons weight. Horses are actively employed in tramming the ore out to the piles; more than 20,000 tons of very fine ore may be seen awaiting the completion of the railway; a branch of the new Newquay and Fowey Railway comes here direct to the quarries. Each of the great quarries is crossed by a very promising lode of silver-lead—the Nos. 1 and 2 lodes of the Great Retallack sett, adjoining to the north and east. These lodes appear to be heaved to the right some few fathoms, but the junction is rather obscure. A little west of No. 1 lead lode, just mentioned, is a deposit of unctuous black flookan, much resembling graphite, which contains 3 to 5 per cent. of free carbon.

At Great Retallack the lode is found to be several fathoms wide, and as elsewhere to make in places very near the surface; at one point it has been sunk upon by former workers to a depth of 40 fms.; it was found to be rich for iron, with a little blende, for the first 25 fms., but at a greater depth the blende increased, and for several months upwards of 500 tons per month were raised and sold at a very low price. In this mine, at Stephens' shaft, a great mass of hornblende rock was met with in sinking. At Duchy Peru Mine, east of Great Retallack, the old workings on the lead and copper lodes were carried to a depth of 50 fms. on the iron lode between 20 and 30 fms.; here the celebrated Peru lode comes in contact with the great iron lode. This Peru lode was only a few inches wide, but it yielded silver-lead of very great richness, some parcels containing 2000 ozs. of silver per ton of ore. Some of the silver occurred in visible metallic fibres as native silver. Very fine white spathose ore is now being broken in large quantity in the stopes above the 40, west of Vallance's shaft; some of this is raised at the old engine shaft by means of a pair of winding-cages; the second pair at work in the county. Magnificent cellular brown hematite is also being raised in quantity at Carter's shaft—a shaft on the western boundary of the Duchy sett, and from here a level is now being driven east to meet the 40, west from Vallance's; the ore here contains several ounces of silver to the ton, but not enough to pay for extraction. Much of the ore contains large vughs: many of these contain a loosely-fitting kernel of white carbonate of iron; the space between the kernel and its enclosing shell is often filled with water, which is quite clear and tasteless. At 20 fms. from surface, east of Vallance's shaft, is a remarkable hot chamber or end. The temperature was about 124° Fahr.; the temperature on arriving at the surface was 64°. The lode is here very large, and is throughout permeated with small crystals of sulphide of iron, mostly iron pyrites; the whole lode appears to be rapidly crumbling down, and is moist with free sulphuric acid, which burns the clothes of the men who venture in. The extreme poverty of the air is also no doubt due to the same cause—the absorption of the oxygen by the sulphur to form sulphuric acid. The ventilation in the neighbouring cross cut is exceedingly good, and the end in question is driven but a very few fathoms in. In the 40, both east and west, much of the killas is black and shining, much resembling the coal shale which so commonly occurs in the coal measures. The black colour is due to free carbon, but he has seen no trace of animal or vegetable structure; this black shale is often pyritous when it contains distinct traces of silver. The killas country about the great lode at Duchy Peru seems to be much disturbed; south of the lode it is hard, and appears to dip towards it, but next the lode it is soft, and dips with it.

A little more than a mile further east, at Wheal Deer Park, extensive excavations again mark the position of this greatest of the Cornish lodes, and no doubt large quantities of ore will be here, too, raised on the opening of the railway. The gossan of the lode is very well seen in the railway cutting at this point, and also close to the new bridge at Fiddler's Green, about two miles further on. Beyond Deer Park the outcrop of the lode is seen on Penhallow Moor. Here the Cornish Consols have worked to some small extent, but at present the works are in abeyance. The general characteristics of the great lode appear to be somewhat as follows:—The upper portion—which, like many other lodes, underlies more rapidly than the deeper parts—appears to be composed of an immense mass of brown hematite, sometimes cellular, sometimes compact. Beneath this—sometimes only a few fathoms from the surface, but always before the sea level is reached—the lode appears to be composed entirely of spathose iron. Everything in the appearance of the ore seems to show that the brown hematite results from a slow change of the spathose ore, which is even now going on. In places this change is no doubt accelerated by the heat produced in the oxidation of pyritous matter, and perhaps by the galvanic action first discovered in lodes by R. W. Fox, F.R.S., many years ago.

It is a remarkable fact that the great bunches of ore in the Perran lode appear to occur just where it is crossed by the very numerous north and south lead lodes of the district. As examples, he refers to the Wheal Golden lodes which cross at the cliff, where the lode is 100 ft. wide; the Trebiskeu and Trebellen lodes, in Mount Mine; the Great Retallack lodes, in Treamble; the Duchy Peru and Wheal Hope lodes, in Duchy Peru; the Shepherd's lode, near Deer Park; Cargoll lode, in Penhallow Moor, &c. The favourable effect of these junctions also shows itself in the lead lodes, which all appear to contain considerable or even very large proportions of silver near their junctions. In the occurrence of large masses of pyrites, blende, yellow copper ore, and argentiferous galena, not only at the intersections, but occasionally in the lode itself away from these intersections, there are indications that the lode in depth—say, 100 to 200 fms.—will contain chiefly the ores of the more

valuable metals, the iron ores simply forming an immense gossan; and if so it will, he believes, be a richer series of mines, perhaps of copper, more probably of lead, than Cornwall has yet seen. Be this, however, as it may, the present proprietors have here a very rich property, as the slightest consideration will show.

It is well known that the average produce of the Cornish tin ores as brought to surface is in the western mines only about 1½ per cent. of black tin, or (say) 30 lbs. per ton of stuff sent to the stamps. In the eastern mines, which are often scarcely more than quarries, the produce is no more than from 4 to 6 lbs. per ton of stuff in many cases. The value of this tin in the stone will certainly be less than 20s., often not more than 15s. per ton of ore. Now for this sum, if there be any considerable quantity, miners are content to raise stuff from an average depth of, perhaps, 100 to 150 fms., to pay all expenses of draining these deep mines, and to subject the ore to a most elaborate series of stamping and dressing operations. Here, on the other hand, the ore is close to the surface in immense quantity: 6d. or 1s. per ton will pay for all the preparation it requires ere it is sold, and the value all round cannot be estimated at much less than 16s. per ton at the shaft's brace. At present brown hematite will fetch freely 17s. 6d. per ton, f.o.b.; calcined spathose considerably over 20s.

The paper gives a very complete account of the iron deposits of the district, and will prove alike valuable to the geologist who reads it merely for its scientific interest, and to the practical mine adventurer desirous of turning the knowledge obtainable from it to commercial advantage.

MINERS' ASSOCIATION OF CORNWALL AND DEVON.

The results of some of the examinations of the various classes held in May, in connection with the Department of Science and Art, South Kensington, have been received, and are as follows:—

REDRUTH CLASS.—Mineralogy: W. L. Chegwidden, first class, advanced stage; Wm. Rich, H. L. Passmore, and H. Tregaskis, second class advanced; W. L. Rowe, and G. H. Richards, first class, elementary stage; James Hocking, C. Berringer, R. H. Patterson, and Thos. Passmore, second elementary.—Inorganic Chemistry: William Rich, first class, advanced stage, with laboratory practice; W. L. Chegwidden, and R. Tregaskis, second class advanced, with laboratory practice; Henry L. Passmore, and Foster Williams, second class advanced, W. L. Rowe, G. H. Richards, and J. H. Berringer, first class elementary, with laboratory practice; James Hocking, R. H. Patterson, and J. H. James, second class elementary.—Mining: Jas. Hocking, W. L. Chegwidden, R. Tregaskis, and Foster Williams, second class elementary stage.

ST. AGNES CLASS.—Mineralogy: Alfred T. Davies, first class, advanced stage; J. Hitchins, second class advanced; William Whitworth, first class, elementary: J. Harper, Fred. Davies, and W. Whitta, second class, elementary.—Inorganic Chemistry: Alfred T. Davies, first class, advanced stage with laboratory practice; Wm. Whitworth, second class advanced; J. Hitchins and Fred. Davies, first class, elementary stage with laboratory practice; Wm. Whitta, second class, elementary.—Mining: A. T. Davies, J. Hitchins, W. Whitworth, and Fred. Davies, second class, elementary.

HAYLE CLASS.—Steam: Jebus Bickle and Henry J. Warren, first class advanced; James Cox, first class, elementary; Thomas E. Bickle, William Hosking, Richard Veale, and Thomas Warren, second class, elementary.

PENZANCE CLASS.—Mineralogy: John W. Avery, E. W. G. Hosking, and Andrew Edwards, first class, elementary; John E. Drew, Richard Eva, and J. W. Berryman, second class, elementary.

PENDEEN CLASS.—Mineralogy: Henry Eddy, second class, elementary.—Inorganic Chemistry: Ephraim Noy, Andrew Angwin, Arthur Tippett, and Henry Eddy, first class, elementary, with laboratory practice.—Mining: W. H. White, A. Angwin, and W. H. Humphreys, second class, elementary.

ST. DAY CLASS.—Mineralogy: Fred. Bawden, first class advanced; John Phillips and George B. Luke, first class, elementary: J. Prout, Francis Luke, and C. Williams, second class, elementary.—Inorganic Chemistry: John Phillips, first class advanced, with laboratory practice; George B. Luke, second class advanced; Francis Luke and Samson Williams, second class, elementary, with laboratory practice; C. William and T. Prout, second class, elementary.

BREAGE CLASS.—Mining: R. H. Tregoning, second class advanced; J. C. Richards, second class, elementary.

CAMBORNE CLASS.—Mineralogy: Thomas H. Allen, second class advanced; Richard Provis, second class, elementary.

ST. AUSTELL CLASS.—Mineralogy: H. Carveth and Thomas Henry Tresise, second class, elementary.

THE ELEMENTS OF METALLURGY.

[FIRST NOTICE.]

It is but a few years since that the only work in the English language treating of the science of metallurgy was the "Manual," by JOHN ARTHUR PHILLIPS; but as his praiseworthy exertions as an Elève de l'Ecole des Mines de Paris, and his untiring researches during several years of subsequent practical experience had, even 22 years ago, rendered him thoroughly competent for the task he had undertaken, there was but little cause of regret that the field of English metallurgical literature remained for a long time otherwise entirely unoccupied; indeed, it may almost be considered to remain similarly unoccupied still, for although there have since been published Dr. Percy's elaborate volumes, and Messrs. Crookes and Röhrig's translation of Kerl's Metallurgy on the one hand, and the excellent little manuals on the Metallurgy of Iron, by Mr. H. Bauermann, and on that of Copper, Lead, and Silver, by Dr. R. H. Lamborn on the other hand, as well as Truran's treatise on the Metallurgy of Iron, Isaac Lowthian Bell on the Chemistry of the Blast-Furnace, and numerous admirable works which have been issued here and in America, there is not one which can be regarded as a substitute for the work of Phillips. The volumes of Dr. Percy are to a great extent a mere collection of materials put together in an undigested form; those of Crookes and Röhrig are better suited to the English metallurgist carrying on business in Germany; Truran's volume relates exclusively to iron, and even with the additions and emendations made by Phillips in the edition issued under his care, was not sufficently general to be equally useful in the several iron manufacturing districts of this country alone, whilst with regard to Bauermann's, Lamborn's, Greenwood's (only half finished), and others of the same class, they are at most but rudimentary treatises not fully adapted to the requirements of men practically engaged, or to be so engaged, in conducting the operations described.

Since his "Manual" first appeared Mr. Phillips has been constantly connected with metallurgical matters, and has thus obtained an amount of experience of which but one or two other writers on the subject can boast (and those in particular branches only), whilst the success he has achieved is a sufficient guarantee that his energies have not been misdirected. His extensive and varied experience has evidently been freely utilised in producing the very valuable volume* just issued, which has all the recommendations of the "Manual," with the additional advantage of bringing the information down to the present time, and embodying his own knowledge and estimates of the processes referred to. The professed object of the work in its present form is to supply within moderate limits such practical information upon general principles and typical processes as may not only afford a comprehensive view of the subject, but also enable the reader to study with advantage more elaborate treatises and original memoirs. This is precisely what the practical man requires; he must thoroughly understand the nature of the process he has to apply, and be competent to modify it to such an extent as to adapt it to the particular material under treatment. Mr. Phillips has aimed at and appears to have completely succeeded in giving information which will give his readers those qualifications, and the importance of them will be the better appreciated when it is considered that a given process, however good, is seldom applicable without some modification to several comparatively similar ores, and that the success or failure of a manipulation can usually be traced to his care or neglect to ascertain with the utmost precision the constituents of the material to be treated. To the neglect of this essential point may be attributed the failure of the numerous attempts to apply the wet process of extracting metals in Cornwall; to the opposite circumstance may be traced the brilliant success which has been obtained under the guidance of Mr. Phillips and his equally careful associates at Widnes.

The principle of division of the subject followed in the "Elements of Metallurgy" is such that the reader interested only in the metallurgy of a particular metal can readily obtain the information sought. By way of introduction, the Physical Properties of Metals are described, and Fuel, Refractory Materials for Furnaces and Crucibles, Iron, Cobalt, Nickel, Aluminium, Copper, tin, Antimony, Arsenic, Zinc, Mercury, Bismuth, Lead, Silver, Gold, and Platinum are subsequently treated of in separate chapters, and in the order named. Both the wet and dry methods of assaying are given with considerable detail, and when, as in the case of ironstones, the value of an ore is materially affected by the nature and quantity of the impurities present, the processes employed for their detection and estimation are fully described. The most reliable authors—English, American, and foreign—have been consulted, and the results of their researches have been embodied in the work, as well as the substance of notes which during more than 20 years have been made by the author in the course of his professional experience as a mining engineer and practical metallurgist, both at home and abroad, so that the value of the book is almost inestimable. There can be no question that the amount of time and labour expended on the book is enormous. With the metallurgy of many of the more important metals he is practically and minutely acquainted, and as he is still similarly occupied no fear need be entertained that even the most resently ascertained facts worthy of record would be omitted. The statistics, too, must have involved an infinite amount of trouble, and will, doubtless, be found reliable. Throughout the volume there are given many original, and apparently carefully executed, analyses, so that altogether it would be difficult to suggest in what particular the work could be improved, or how it could be rendered more useful to the class of students for whom it is intended. Phillips's "Manual" has long deservedly enjoyed a high reputation amongst metallurgical teachers and metallurgical students, and the "Elements,' which is to occupy the place of a new edition of the original book, which has been for some time out of print, will undoubtedly have an equally favourable reception, and retain for as long a time an enviable position amongst the metallurgical literature of English-speaking countries.

* "Elements of Metallurgy: a Practical Treatise on the Art of Extracting Metals from their Ores." By J. ARTHUR PHILLIPS, M. Inst. C.E., F.G.S., F.C.S., &c., Ancien Elève de l'Ecole des Mines de Paris. London: Charles Griffin and Co., Stationers' Hall-court.

THE CARDIGANSHIRE MINES—No. II.

To the west of the Crown Mine (with the mention of which the notice of Capt. Absalom Francis's pamphlet* in last week's Journal was concluded) is the East Llwynteify, having the River Rheidol for its western boundry. More than a century ago Mr. Morris reported that the Great Ystymtyhen vein, in crossing the Rheidol at this place, shows a rib of lead ore 6 in. wide, solid, with a considerable quantity of blende; he has no doubt of the value of the porperty. Llwynteify is on the west bank of the Rheidol, and has a mile on the run of the great Ystymtyhen and other veins. Taking the lodes, the extent of the grant, and the advantages for working the same, he considers it would be difficult to select another such property in any county, and that there is no doubt that if the present company succeed in raising the intended working capital, and apply it judiciously to the proper development of the veins in the grant, it will become a property second to none that has ever been laid open in the county. Further to the west are the Aberystwith mines, comprising Bwlchgwyn and Penrhiw Mines. They are now making very fair returns for a beginning, and as the mines are opened out and trial made, which can easily be accomplished by cross-cutting at different places, and at different levels, to the old Ystymtyhen lode, he has no doubt of their meeting with large quantities of paying ground.

Old Ystymtyhen is a very old and extensively wrought mine, and worked away from the surface by the old miners for a considerable length on the great Ystymtyhen vein, as deep as they were enabled to contend with the drawing of the water and stuff. The deep adit cross-cut is from 50 to 60 fms. above the bed of the Rheidol, so that the mine can only be termed at the present moment a mere surface trial, notwithstanding the very extensive workings done here. The component parts of the lode here are sulphuric mundic, blende, gossan, crystallised spar, and lead ore; and for 20 miles eastward, at the Van Mine, the vein is very much the same both in size and everything else, and there is but little doubt on Capt. Francis's mind that this vein traverses the Penrhiw, Bwlchgwyn, Llwynteify, the Crown, West Esgair Lle, near the Great West Van, then on to Aberdaunant, the Van Consols, then the Van, East Van, &c.; whilst westward, and adjoining this property, is the Tynyfron Mine, worked many years ago by means of an adit level driven in from the north bank of the Rheidol, but this adit reaches the lode at a comparatively shallow depth; the lode is large, and he had no doubt that if it be properly tried in depth good results would attend the trial. Gogerddan extends from the Tynyfron eastward as far west as to join the Caegynon boundry. It is well worthy of a spirited development, as it would unquestionably open out a good course of ore at the junction, and would also act as a sort of key to all the mines for some miles eastward. At Caegynon Mine the returns are now about 10 tons of lead and 40 tons of blende monthly, and he believes that if proper attention be paid to the western portion of the sett, and cross-cuts extended north from the lode to cut the lodes in South Bwadrain, Caegynon can yet be made a good paying concern. South Bwadrain, and Gelliveirin are favourably referred to. Looking at the Tyllwyd fairly, and with an impartial feeling, he will not be surprised if eventually the profits reach the very respectable figure or 10,000*l.* a year, or even more.

At Nant-yr-honen, 6 or 7 miles from Aberystwith toward Devil's Bridge, the lode is opened on for a considerable distance about 6 ft. wide, containing a fine gossan, blende, and lead ore, and a fair proportion of crystallised quartz. A greater depth on the course of the lode, however, is required before any great amount of profit can be realised, and this can be accomplished by driving in a deep adit level from the Cefn Nant-yr-honen, now held by the same company. When the machinery in course of erection shall have been completed—say, in 12 months—by using proper energy he looks forward with confidence to their commencing to pay an exceedingly good percentage on the sum invested. From Abernant he does not anticipate any very good results. He considers Aberffrwyd worthy of a fair trial. Gothic Mine has made fair returns, but not profits. At West Imperial, or Geifron, Mine the lode is from 9 to 12 ft. wide, with a fair proportion of lead ore throughout. The Rheidol lead mines, consisting at present of Llwybrllwynog, Gwaithcoch, Alltddu, and Erwtomedd, have been extensively worked. The scenery about these mines is magnificent. North Hafod is well deserving a spirited trial, and at no distant date it will undoubtedly claim the attention of some party who will be able to raise a sufficient sum (say, 5000*l.*) to develope the property fairly. At Bodcoll good machinery for pumping, crushing, and dressing has been erected, and they have opened out a mine which, if worked with energy both in laying open ground in length as well as depth on the lode, cannot fail to give lasting and substantial dividends. At West Bodcoll very little has been done. Llaneither will require about 10,000*l.* to erect the proper machinery and open out a sufficient quantity of ore ground to guarantee the payment of regular dividends. At De Broke, formerly Tygwyn, Mine he considers it will require greater depth to make the vein become paying. Greater depth is required both at Dolwen and East Dolwen before any profits will be realised.

East Hafod, on the north of the River Ystwith, has had a very rich bunch of ore worked over and under as deep as they could work without machinery. Capt. Francis is of opinion that if the course of ore found in the adit just referred to had been tried at a greater depth it would have led them into a good course of ore for some considerable length, and would open out in all probability a good paying mine. Pentre Brunant will, he thinks, with good machinery and management, open out lasting and profitable. Cwmystwith is still a very shallow mine, and will, he considers, when tried properly and in depth make as rich a property as it ever was, and a small amount of capital, energy, and judgment would soon achieve this very desirable object. Blaencwm and West Blaencwm he considers well worthy of trial. If a small sum of money (say, 10,000*l.*) were judiciously laid out at Craig-Coch, Cwmystwith, he thinks it could not fail to become a most valuable mine. At Pontrhyd-y-Groes a fine lode crops out at surface. Frongoch has been, and now is, the richest mine in the county, and has yielded immense profits. Blaencaenant is favourably mentioned. At Levelfawr very extensive and successful operations have been carried on. Glogfawr has also been extensively wrought. Grogwinion, or Brynystwith, will not, he thinks, fail in becoming one of the best mines in Cardiganshire. At Penlan he is inclined to believe a very great body of lead ore will be opened out. At Broncaradoc he considers that all that is now wanted is the erection of good and powerful machinery to sink the mine to a good depth, to draw the stuff, and to dress it by means of the most approved appliances.

In Llwynmalees Mine the lode is very large, probably from 30 to 40 ft. wide, composed of really a good gossan, not differing much in this respect from the gossan of Frongoch, a good crystallised quartz, and a good lode stone. During the past 30 years there have been considerable returns, but no profits. Esgairmwyn was most successfully worked about 120 years ago, and Capt. Francis thinks that any party embarking in the mine would undoubtedly reap a good harvest, but that it will require some time to fully lay open the ore ground, to sink the shaft to the required depth, and to erect the necessary machinery—say, three years—but when once accomplished the mine could not fail to give very large and regular dividends for the next half-century. Esgairdu Mine offers a good opportunity for the investment of capital. Cwm-mawr, belonging to the Lisburne Mines Company, has remained unworked up to the present time, he presumes as a sort of nest egg when required. At South Lisburne the lode is of good size, being about 12 ft. wide, and carrying a rich unmistakeable gossan at surface, which alone is a sufficient guarantee in this county of its continuing very productive in depth. Rhysgog Mine requires a capital of (say) 10,000*l.* for the erection of a good lot of machinery for pumping, crushing, and dressing, and the proper laying open of the ore ground at a greater depth, and to a greater extent lengthwise; he fully believes that then no mine which has been worked in that district would surpass it in richness or durability. At Brongwyn a very fine lode, rich in silver, was discovered and laid open at surface. At Llanfair he estimates that the old hillocks, or waste heaps, and the stuff broken and lying in the mine will yield when properly dressed 10,000*l.* profit. The returns made from the property may be estimated at about 80,000*l.* worth of lead and 1,000,000 ozs. of silver.

Whenever the Fachddu property shall have a fair trial, Captain Francis has no doubt whatever that it will prove as productive as the Llanfair Mine has turned out to be, and with a good field of machinery it will reap the advantages of cheap dressing, crushing, and drawing from its starting from the adit level; whereas at Llanfair all the water and stuff had to be drawn by hand-power, as well as the ore crushed by hands by small bucking hammers. At Gwaithvach 3000*l.* judiciously expended on the best dressing machinery—stone-breaker, with a powerful wheel and crusher—the mine would, he thinks, soon be brought into a condition to pay cent. per cent. upon that capital. Esgairgadfach is another of the Llanddewibrefi series, and if taken in hand by a spirited company a small capital could not fail to make it pay an extremely good percentage on what it requires. At Brefi several very fine lodes have been found, producing both good lead and copper ores of a very rich quality.

Although but the briefest outline of Capt. Francis's pamphlet has here been given, it will suffice to permit of an opinion being formed as to its merits. To those desirous of visiting the mines themselves the pamphlet will form a valuable guide-book, whilst the benefit which will result from the additional attention which will be directed to the mines of Cardiganshire will more than compensate for the slightly adverse views which he has expressed concerning the prospects of certain properties which have not yet been thoroughly developed.

* "History of the Cardiganshire Mines from the Earliest Ages to A.D. 1874, with their Present Position and Prospects." By ABSALOM FRANCIS, Mining Agent, Engineer, and Surveyor. Aberystwith: Morgan, Pier-street; and London, at the *Mining Journal* Office, 26, Fleet-street. Price 2s. 6d.

FOREIGN MINING AND METALLURGY.

The Belgian iron trade is still extremely quiet. The quietness which prevails may be said, indeed, to border on depression. The works are pretty well employed it is true, but heavy orders calculated to ensure the future still make default, and if prices remain firm this arises from the state of the coal trade, and the hope of a revival in affairs, which cannot fail to manifest itself, it is thought after a long period of stagnation. Luxembourg pig having advanced 10d. to 1s. 8d. per ton, the proprietors of Belgian blast-furnaces are now enabled to compete with their redoubtable opponents in the Grand Duchy. Casting pig, No. 5, has been quoted at 4*l.* 4s. per ton, refining pig of good quality at 3*l.* 6s. to 3*l.* 6s. 6d. per ton, and ordinary refining pig at 3*l.* 3s. 6d. to 3*l.* 4s. per ton. Merchants' iron and plates remain without variation; the first is firmly maintained at 8*l.* to 8*l.* 4s. per ton. It is thought that the demand for pig and iron must increase in Belgium. Railway companies, ironfounders, manufacturers of plant and engines, blacksmiths, and even iron merchants have all for some time past held only very limited stocks of iron, and when there is a general impression that a further fall has been checked for the season all such parties as those enumerated will, it is expected, present themselves as purchasers in the market. The direction of the Finland Railways—Alleo to Tammersfors and Tavastehus—is about to let contracts for 15,700 tons of rails with accessories. The new Terre Noire process for the manufacture of steel by the use of ferro-manganese is about to be tried in three of the Belgian works.

There has been a continued improvement in copper at Paris. Chilian copper in bars has been quoted at 85*l.*; ditto, ordinary descriptions, 83*l.*; ditto in ingots, 89*l.* per ton. English tough cake has made 88*l.*, and pure Corocoro minerals 85*l.* per ton at Paris. There has been little doing in Chilian copper at Havre; quotations have followed nominally those of the English markets. The aspect of the German copper markets has scarcely changed; transactions have been confined almost exclusively to the requirements of consumption; prices have been generally, however, maintained with firmness. Tin has slightly fallen at Paris; Banca, delivered at Havre or Paris, has made 109*l.*; Straits ditto, 107*l.*; and English, delivered at Havre or Rouen, 106*l.* per ton. The Marseilles tin market has remained without business, but prices have been pretty well sustained. Tin has been tolerably firm upon the Rotterdam markets; some transactions have taken place in Banca, at from 60 fls. to 62½ fls., but sellers have become somewhat scarce. Billiton has been dealt in at from 57½ fls. to 58 fls. The demand for tin upon consumptive account has, upon the whole, remained active at Rotterdam. The German tin markets have exhibited generally no great amount of animation. Lead has sustained itself without much change at Paris. At Marseilles lead has been rather sought after, but at the same time prices have not varied materially. Business in tin has not been very active in Germany, but prices have been maintained. There has been a little feebleness in the zinc market; Silesian, delivered at Havre, has made 23*l.* 4s.; other good marks, delivered at Havre, 22*l.* 16s.; and ditto at Paris, 23*l.* per ton. The German zinc markets have not been very active, but firmness has predominated.

Some of the Russian papers state that the rapidly increasing demand for heavy iron manufactures, such as locomotive and other steam-engines, railway carriages and trucks, and iron rails for the use of the already existing and projected railways both at home and in Central Asia, has stimulated this branch of industry in Russia to an extent which cannot fail to exercise the most beneficial influence upon national prosperity. There are now in Russia several iron foundries where iron rails of excellent quality are manufactured by thousands. At the iron foundry at Khartsiz on the Kursk-Charkoff-Azoff Railway during the month of March last 36,000 poods of cast-iron were manufactured, 4570 pieces of rails weighing 48,000 poods were made, and 50,000 poods of iron were prepared for the use of rails. Total, 134,000 poods, or about 2392 tons 17 cwts. English. On April 20 last 30,000 poods of rails were delivered for the use of the new Sebastopol Railway.

Prices have slightly hardened in the French iron trade. Orders have become rather more numerous and more sustained. It is now generally supposed that French metallurgical industry will rally rather more promptly than had been expected from the prostration into which it had fallen. At the same time, it will not do to indulge in illusions in regard to the state of metallurgical affairs, as a sudden revolution can scarcely be anticipated: we must rather be contented, probably, with small assured profits, instead of speculative and unusual realisations. It is announced from St. Dizier that charcoal-made pig, for refining, is maintained at 5*l.* to 5*l.* 4s. per ton, while coke-made iron has brought 8*l.* 12s. to 8*l.* 16s. per ton. In the Meurthe-et-Moselle group refining pig is worth 3*l.* to 3*l.* 1s. 8d. per ton. The importations of iron and plates into France in the first five months of this year, as compared with the corresponding period of 1873, have not sensibly varied. The exports generally are similar to those of 1873, although a slight improvement may be noted in favour of the present year.

There has been no material change in the French coal trade. There

has been, perhaps, a little feebleness in the South, but otherwise there has been no variation to note in quotations. The closing of navigations incident to this season is not expected to be attended with any serious consequences. The supplies required for Paris are assured, as well as those of the principal works. During the enforced suspension of the navigations stocks will have to re-form themselves, so that unless a rapid and unforeseen stimulus should be communicated to industrial pursuits the state of affairs will probably be found on the re-opening of the navigations very much what it is at present. An advance in coal prices does not appear probable in Belgium, as the working miners are accepting, without complaints, the reductions in wages proposed to them. On the other hand, a reduction in coal rates is not likely, as the requirements of industry and commerce are sufficient to guarantee the eventual sale of all the coal raised in the North of France, as well as in Belgium. The Vendin-lez-Bethune Colliery Company will pay a dividend of 1*l.* 12s. per share for 1873. The Bouches-du-Rhône Collieries Company will pay, on July 1, a dividend of 16s. per share for 1873. The dividend of the Malfidano Mines Company for 1873-4 has been fixed at 2*l.* 12s. per share.

The Belgian Coal Trade has presented rather an improved appearance. Present rates must be pronounced sufficiently remunerative for colliery proprietors, while existing quotations are also supported with firmness. Contracts at current rates are stated to have been now concluded with industrials for deliveries which will continue until the close of the year. The existing stability of prices is inducing consumers to give out orders more freely than they would probably otherwise do. The Belgian General Gas Company has just concluded contracts for coal to the extent of upwards of 30,000 tons, at 13s. 8d. per ton, for the supply of its Belgian works and part of its French works. Similar descriptions of coal were quoted at 24s. per ton some months since. Upon the whole, the general state of affairs is not bad, and if the heavy, not to say enormous, profits of the past are still regretted by some insatiable colliery proprietors, the existing condition of things in which coalowners live and let live is much to be preferred. A slight advance upon present rates would probably have the effect of inundating Belgium with English and Westphalian coal. The Charleroi Canal will be closed in a few days, and there has been some activity in consequence in that district.

Meetings of Public Companies.

THE FLAGSTAFF SILVER MINING COMPANY OF UTAH.

An extraordinary general meeting of shareholders was held at the Cannon-street Hotel, on Wednesday, for the purpose of reporting to the shareholders the progress that had been made with regard to the negociations with Mr. Davis, and the desirability of carrying out the proceedings determined on by the majority of the board, as recommended by counsel,—Mr. T. TWEED in the chair.

Mr. J. RENDALL GOLE (secretary) read the notice convening the meeting.

The CHAIRMAN said he had been appointed Chairman of this company in consequence of Mr. White, the previous Chairman, having resigned. Perhaps he had better read the letter which Mr. White had forwarded to the board in connection with the matter. The letter stated that after giving mature consideration to what had passed at the last meeting, and the directors acting in direct opposition to his views as to what he considered the true policy of the company, Mr. White felt there was no alternative but to resign. Shareholders would see by that letter that there was a kind of—he would not say disunion—difference of opinion as to the policy which should be pursued. Since the present board had been in office they had had but one object in view, and that was solely to advance the interest of the company, and they had deemed it advisable the moment the slightest difference of opinion occurred to come before the shareholders, and tell them what that difference of opinion was. The resolution at the last meeting was that the directors should take such proceedings against the late directors and Mr. Davis as deemed advisable, or to enter into such compromises as may be for the true interest of the company. With that view, and believing in the advisability of a friendly compromise, they at once put themselves in communication with Mr. Davis; two of his co-directors—Mr. Mackenzie and Mr. Woodfield—went over to Paris to see Mr. Davis, that gentleman having left for Paris almost immediately after the meeting. Mr. Davis said he could only receive Messrs. Mackenzie and Woodfield as individual shareholders, because he could enter into no negociations with the board until one of its members had apologised or resigned. Having no interest but that of the company, those gentlemen returned. The board conferred with Mr. Burnand when that gentleman resigned. Believing that Mr. Davis was actuated by the feelings of a gentleman, the board at once again put themselves in communication with Mr. Davis, informing him that Mr. Burnand had resigned; they then thought there could not be any possibility of obstacle between Mr. Davis and the directors. Mr. Davis wrote to Mr. White, as the Chairman of the company, asking him to come to Paris, as there was no longer any obstacle in the way of compromise. But it was found that Mr. Davis's terms were more exorbitant than ever—the debts in London were 5000*l.*, in Utah 11,000*l.*, and the ore contracts 55,000*l.*, or upwards of 70,000*l.*; besides this amount Mr. Davis said he must have interest at the rate of 5 per cent., and would not listen to any other terms. The company had no power to borrow more than 10,000*l.*, and Mr. Davis had no legal claim beyond that amount against the company; but he asks—by way of compromise—to give him every shilling which he could by any possibility make up, without giving any accounts to test the correctness of the items. Of course, they could not agree to such terms. He believed Mr. White would have compromised the matter for 50,000*l.*; and seeing the anxiety of this gentleman, and his determination to have his "pound of flesh," if the directors differed with Mr. White, they thought it advisable to sanction such a state of things. That is the history of this matter. The directors had done everything to compromise it, but Mr. Davis was in Paris, and determined to come to no compromise at all. Mr. Davis says the mine is a good one, paying its way, and by degrees paying him off. They said to Mr. Davis, let him take his debt at a certain amount of money, and let him keep possession of the mine for the purpose of paying himself off, but to divide the profits equally between himself and the shareholders. It struck him (the Chairman) that would be a fair proposition. He believed Mr. White was still anxious to compromise the matter, and had asked Mr. Davis to fix a date when he would give up the mine, but Mr. White did not make that proposition to him. The directors, however, had written to Mr. Davis asking him if he were paid off in October whether he would be ready to give up the mine on Nov. 1. No reply had been received to that letter; and, finding it utterly impossible to come to any kind of arrangement with Mr. Davis, the directors had called this meeting to ask the approval of the shareholders to file a bill in Chancery against the late directors and Mr. Davis, for the purpose of obtaining an injunction preventing Mr. Davis receiving any further money from the mine, and to get a receiver appointed who should at once proceed against Mr. Davis for an account of his claim. That course the directors considered to be just and right for the shareholders, and at the same time in the true interest of the company. The resolution suggested was that the board be authorised to take such steps as counsel may advise, but that the directors have still authority to enter into any compromise they may deem best for the true interest of the company.

Mr. UPPLEBY, as the holder of 250 shares, which had cost him 2500*l.*, begged to propose that resolution. As a lawyer he was strongly of opinion they had a good remedy against the late directors for having entered into nefarious contracts with Mr. Davis, the directors having no power to borrow more than 10,000*l.*, and by which the dividends had been increased for—he was afraid—nefarious purposes.

Mr. T. G. TAYLOR: Will the solicitor point out in what way they could deal with Mr. Davis?

The CHAIRMAN: The board have the opinion of counsel—Mr. Higgins—in which he very clearly points out the line they ought to take.

A SHAREHOLDER: What is the opinion of counsel?——The CHAIRMAN: I think it is not advisable or desirable to state it at present.

Mr. TAYLOR: You cannot expect from the late directors the whole of the shareholders' claim. I think our claim will extend beyond 70,000*l.*, because we have a right to have the mine re-instated in a proper position. What means had they of bringing Mr. Davis to book?

The CHAIRMAN: The contract was made in England; therefore Mr. Davis would be amenable to the laws of this country.

Serjeant SLEIGH: Suppose you get judgment, and Mr. Davis has no property in this country; what advantage can you get by it?

The CHAIRMAN: There must be a law in America, as well as here.

A SHAREHOLDER: I represent a number of country shareholders, and under my advice they sent to Utah to get information about the mine, but all they could get was "The mine promises well." What is the total amount of Mr. Davis's claims?

The CHAIRMAN: We do not admit his claim.

A SHAREHOLDER: What does Mr. White propose you should do?

The CHAIRMAN: The other directors thought a bill in Chancery should be filed against the late directors and Mr. Davis. Mr. White, on the contrary, wishes no proceedings whatever to be taken against Mr. Davis. It appears that negociations are still going on, although anything like a prospect seems as remote as ever.

Col. CHURCH: I am an original shareholder. It appears the policy the board proposes to pursue is the most ludicrous ever known. We want to get possession of the mine and to work it. I believe it to be one of the most valuable mines in the United States, and to file a bill in Chancery against the late directors or Mr. Davis appears to me to be equal with a Pope's bull. It was worse than a mortgage of the mine—Davis could actually foreclose for the amount owing to him, and be in possession of the mine within 30 days. I happened to be in Paris the day before yesterday, when I called upon Mr. Davis. Mr. Davis, I think, talks fairly, he says if the present board uphold the agreement entered into with him there would be no difficulty in arranging for turning over the mine. Since Mr. Davis took possession of the mine it has paid more than in the whole of the previous year. The mine is developing well, and Mr. Davis has built another furnace. It appears that under Mr. Davis's management the mine is gaining ground, and paying off its debts. Mr. Davis will turn over the mine if he has returned to him the money he actually advanced to the company.

The CHAIRMAN: Mr. Davis received of the first dividend of 6000*l.* no less than 4381*l.*; of the second, 3882*l.*; of the third, 3382*l.*; of the fourth, 3041*l.*; and of the fifth, 2781*l.*

Colonel CHURCH: It seems to me if he was a stockholder to that extent he had a perfect right to the dividends.

Mr. UPPLEBY: It is very clear Mr. Davis advanced money so as to declare dividends, and advance the price of the shares, when he sold his own.

Mr. GARNE seconded the proposition. He did so because he understood the late directors had acted illegally, and because, therefore, Mr. Davis had illegal possession of the mine. Surely, if such were the case there must be some remedy in America.

Sergeant SLEIGH said the question was whether the advance had been made by Mr. Davis for the purposes of dividend, or for the purchase of ore to be delivered. He wished to know whether the contracts between Mr. Davis and the company for the advance of money were in writing or not? If they were, the writing must be produced.——The CHAIRMAN said the contracts were in writing, but it was the first time he had ever heard that contracts made by a board of directors should be produced at a public meeting. The board had been advised by most eminent council that those contracts are illegal.

Mr. T. G. TAYLOR understood there was a gentleman present who could throw a great deal of light upon the matter—he referred to Mr. Maxwell. He (Mr. Taylor) thought it would be unwise to come to any conclusion without hearing what Mr. Maxwell had to say.

A SHAREHOLDER asked what transactions the board had had with Mr. Davis, and what were the nature of the communications between them?——The CHAIRMAN said if he was to go through the whole of them he should keep the meeting for a month.

Serjeant SLEIGH said it so happened that when in Paris, since the last meeting, he called as a shareholder upon Mr. Davis, and he was bound to say that the impression left upon his mind was such that he was thoroughly astounded when he received the notice by which this meeting was convened, because he certainly gathered that Mr. Davis was perfectly prepared to enter into an equitable arrangement with the directors; but he also gathered that there were certain difficulties in the way, because one gentleman had called Mr. Davis a thief, and another said he was an angel. (Laughter.) He thought it was much to be regretted such a proposition as that now before the meeting should be carried while there was the slightest hope of negociation; he deeply regretted the secession from the board of Mr. White, its chairman, than whom there could be no more honourable man; and he ventured to think that if those negociations had been prolonged this matter might have been brought to an issue without resorting to means the result of which usually was that the lawyers got the oyster and the shareholders the shells. Therefore, he ventured to suggest that another effort should be made to prevent anything like war *à l'outrance*, and he would propose as an amendment that this meeting requests Mr. Henry White to withdraw his resignation, and that an adjournment should take place for a fortnight for the purpose of seeing whether Mr. White complies with the request or not. The Chairman had made reference to a letter in which Mr. Davis said he would be happy to see Mr. White in this matter. Would the Chairman produce that letter, in which Mr. Davis said if Mr White would come to Paris, accompanied by him (Serjeant Sleigh) the whole thing might be brought to a conclusion within an hour? Would the Chairman produce that letter?

The CHAIRMAN: Mr. White has it.

Sergeant SLEIGH: Then I am not contradicted in the fact.

Mr. GREENFIELD seconded the amendment, and suggested that the following words should be added, "Inasmuch as the the meeting in its present state of information is not prepared to carry out the resolution."

Mr. STAPLES said, as a friend of Mr. Davis, but as a shareholder, he thought some further information should be given to the shareholders. He had lost a great deal of money, as he held shares at a very high price. He knew very well if they went into litigation they would only get the shells. The value of good management had been seen by the fact that from Jan. 14 to March 31 of the present year there had been ore sold to the value of $188,000, at a cost of $121,000, or a net profit of something like 14,000*l.* That had been done with the furnaces in a deplorable condition, and in midwinter, with bad roads. If this result could be obtained in winter, and by a lower grade of ore, he wanted to know why those dividends were not legitimately paid? When Mr. Davis entered into that arrangement there were several suits, which he had cleared away, and the property was heavily in debt. Mr. Davis found the money to pay off all claims, and got possession of the mine, which he (Mr. Staples) considered fair and equitable. The debts in Utah were 40,000*l.*, and Mr. Davis had spent 6000*l.* in new furnaces, doubling the former capacity, but the present debts were—in London, 5000*l.*; in Utah, 5000*l.* Mr. Davis does not want to retain the property, he merely wants his money back. Mr. Davis had written a letter to Mr. White, who had authorised him to make what use of it he (Mr. Staples) chose. He could not read it, because it was a private communication, but he would state the fact. It was that Mr. Davis would give up possession as soon as he had paid himself—in a right and proper manner—the ore to which he was entitled, or he would arrange to accept its equivalent. According to recent indications, in four months from now Mr. Davis would be paid off. In the meantime, if the shareholders would have to wait too long for dividends, Mr. Davis was prepared to pay them 6 per cent. out of the profits. The mine was being opened out fairly and properly, and not having its "eyes picked out." Mr. Davis's ambition was to show that this mine was a valuable property, and he wished to give it up as a valuable property. Were the shareholders under such circumstances going to allow this board to take it into Chancery? He wanted to know how it was that Mr. Snell, the solicitor, had now so magnanimously come to the fore? Mr. Snell first appeared in Flagstaff, then in Last Chance and Tecoma, and again in Emma, constantly turning up litigation everywhere.——Mr. SNELL: That's untrue, because I have nothing to do with Last Chance.

Mr. STAPLES: No; and simply because the shareholders decided to continue the arrangement. And somebody here whispers Camp Floyd. He (Mr. Staples) wanted the property protected, and it was for the shareholders—not the lawyers—to say whether they would go to law.

Mr. GARDE said all that Mr. Staples had said was a mere statement. He did not know the shareholders were antagonistic to Mr. Davis, and he understood that Mr. Staples was Mr. Davis's broker, and, it may be, the holder of Mr. Davis's shares.

A SHAREHOLDER said he was a particular friend of Mr. Davis, and was glad to find that Mr. Staples had had the courage to defend an absent gentleman. He did think it was hardly fair to have but one side of this story and not the other. Mr. Davis does not wish for litigation. A statement had been made that Mr. Davis left this city after the last meeting; on the contrary, Mr. Davis left before the meeting.

A SHAREHOLDER said that the board told them the door was absolutely closed to any arrangement, but Serjeant Sleigh told them it was not absolutely closed.

Serjeant SLEIGH said he was assured it was not closed. The question was one of policy. Mr. Davis advanced this money knowing it was to be paid in dividends, which had not been earned. They knew the collateral circumstances, and of the introduction of the Tecoma Mine, but the simple question was whether as a matter of policy they should endeavour to induce Mr. White to step in and try to make a friendly arrangement?

The CHAIRMAN said there was a perfectly cordial and good feeling between the directors and Mr. White, and so far as they were concerned they would be most happy to see him back and take his seat. But they had just got into this position—no stone had been left unturned to bring about an arrangement, but without any satisfactory result. They had always heard from Mr. Davis's friends that he was a man easily treated with, and upon that the board had traded, but Mr. Davis would not come to any such arrangement. It had been said the board wished to go to law. The best reply to that statement was to put another question—had they filed a bill in Chancery, which they were empowered to do on April 16—had they taken a single step against Mr. Davis, of which he or his friends could complain? Who had taunted the board that they wished for litigation? He had heard Mr. Staples's grand flourish about the mine—if this mine were so good whose fault was it that it was in its present position? He was constrained to say that he pitied the late directors, who were led into it by Mr. Erwin Davis, who sold it for 300,000*l.* Let not the shareholders be led away by the apparent zeal of Mr. Staples, who was Mr. Davis's broker. It was easy to throw odium upon Mr. Snell, but he (the Chairman) knew whom he would chose of the two. If there be anything in what Serjeant Sleigh had said about his interview with Mr. Davis, was Serjeant Sleigh prepared to pledge his honour and his word that an equitable compromise could be effected? He (the Chairman) would never believe it till he saw it in black and white. And why? Because he had sat at this board three months, and notwithstanding every attempt had been unable to get any hold upon him. Mr. Davis wanted them to confirm these illegal contracts and make them legal, which he would never do. (Hear, hear.) The directors wanted no litigation, but they did want this matter settled. They had no objection to the amendment, except that which involved the interest of the company.

Serjeant SLEIGH said he knew no more of Mr. Davis than any stranger in the room. It was at the request of the Chairman that he saw Mr. Davis, and how on earth he could be expected to pledge Mr. Davis to any course he could not imagine.

Mr. WOODFIELD (a director) said some of Mr. Staples's figures were correct, but some he could not check, because Mr. Staples had had them from Mr. Davis. From the beginning Mr. Davis had told them he had the whip-hand of them, and would keep them in subjection. If he thought there was any chance of ever getting the mine out of Mr. Davis's hands he would do anything rather than go to law, but he must confess he saw no chance. He was sorry to say that from the accounts furnished to the board by Mr. Davis—represented by a mass of papers and vouchers—he (Mr. Woodfield) had very little faith in the present management of the mine. The vouchers had passed into the hands of their accountant, who had given them great attention, and his report confirmed his (Mr. Woodfield's) opinion on the subject. Mr. Davis had made a large expenditure upon the Last Chance Mine which had been debited to Flagstaff, and the debt had been increased upon Last Chance by $47,000; no doubt the same remarks apply to Tecoma. If Flagstaff made profits, and they went to work on Last Chance or Tecoma, there was very little chance of getting it out of Mr. Davis's hands. He had been informed that the haulage could be done at $5½ and $6 per ton, but Mr. Patrick had made a contract to pay his own brother $8 per ton; and Mr. Patrick was incurring great expense in the use of his brother's teams while the company's mules had been sent out to grass at great expense to the company. He cordially gave his support to the proposition.

A question arose as to whether Mr. Maxwell should be heard before or after the business of the meeting had been disposed of. It was decided that the amendment should be put, upon which 33 hands were held up in its favour.——The CHAIRMAN declared it carried, and the resolution negatived.

Mr. MAXWELL stated that as the other gentleman had made various reflections on past and present management, he considered that, as Englishmen, the stockholders should hear what he had got to say in reply. After some further interruptions, Mr. Maxwell stated that he took charge of the mine about the middle of June, 1872, and there had been no profit made since January; there was then a debt of over $50,000 due upon the mine, which was cleared off, and $4000 remitted to London in the month of August, 6000*l.* in the month of September, 8000*l.* in the month of October, 8000*l.* in the month of November, and 7500*l.* in the month of December. At this time workings were suspended in consequence of the snow slides and the horse disease. The London office was advised of these facts by cable, and the suggestion made that dividends should be suspended for a period. I was, however, instructed to haul ore at any cost, and accordingly did so, and kept the furnaces running until April, though at no profit, in consequence of the heavy expenses and fixed charges, and the small produce of bullion. At the end of the year, in addition to the large remittances to London, the reserves of ore in the mine had been increased from 5500 tons to 18,000 tons, and whatever notions the gentleman may have about management, I consider this to be a very good result of mining operations. These facts ought to prove very fairly the value of the mine. In April, 1873, Mr. Forbes arrived with full powers of attorney, and I was entrusted to increase the yield of the mine to 100 tons per day. This I considered very bad policy, and so expressed myself, for the reason that in the necessarily limited space in the workings it would be impossible to select carefully the ore sent away, and separate the ore from the low-grade gangue matter, thus having to pay the full rate of carriage to market on the latter, which should not leave the mine without being dressed to a sufficient richness to bear carriage. For this, and other reasons with which all who are acquainted with mining operations well know, I considered that the mine would be unfairly worked, and I tendered my resignation, to take effect on Nov. 8, 1873, and repudiated any responsibility in the matter. In October, 1873, the company was nearly clear of debt in Utah, when the financial panic broke out, and thereby a loss of some $30,000 was incurred by the company on their sales of bullion. About this time, also, Mr. Patrick was desirous of being paid the amount of $25,000, and likewise the interest on some orders which had been issued from the London office in February and March of 1872. Capt. Forbes's term of office being up on Nov. 16, 1873, I was pressed by the present superintendent and cable communications to London to remain with the company after his departure, which I consented to do, believing fully that I would be able to get the mine into a dividend-paying state again by about the end of March, 1874, in addition to completing the ore contracts so far as I understood the company's obligations to extend—to delivering the ore at the ore house, the buyer to sack it, and take it away from there at his own cost and risk, and these views I communicated to the London office. Capt. Forbes attached the mine for the debt due to him, and I cabled to London for assistance, and at the time I was receiving cables from the company that the remittance would be made without fail, and be sure to arrive on a certain Tuesday morning. They were at the same time making arrangements to hand over all the properties, and on the Tuesday morning I received a cable to hand over everything, including all the books, &c., which I did. As far as accounts are concerned, Mr. de Metz, the chief accountant of the company brought out with him all the vouchers, which had hitherto been sent over to London, and compared the books with them and the vouchers which had subsequently arisen. This gentleman made a most careful examination of the books, at which he had been occupied nearly three months at the time he was requested to hand them over to Mr. Patrick. Mr. de Metz is here present, I observe. I addressed a circular to the shareholders from San Francsicso, and upon my arrival in this country, in April last, I wrote to the secretary, and told him of my arrival in London. I have several times since waited at the office, but have not been honoured with an interview by the directors. I have had no opportunity of making any statement to the shareholders respecting my management of their affairs, and I am voluntarily here to-day with the sole object of answering any questions they may have to put, and giving them all the information I can in respect of their property.

Several questions were then asked, and replied to by Mr. MAXWELL.

A SHAREHOLDER asked Mr. Maxwell where the 3000 tons of ore in Tecoma was?

Mr. MAXWELL stated that this quantity of ore was there without doubt, but that its quality so far had not reached the value which was at one time anticipated that it would. He had heard from Utah that the furnaces had again started, and he was hopeful that good results would follow.——The meeting then adjourned.

GOLD MINING COMPANY OF YUBA.

The fifth ordinary general meeting of shareholders was held at the London Tavern, Bishopsgate, on Monday—

Mr. H. E. ORMEROD in the chair.

Mr. T. STEVENS (the secretary) read the notice convening the meeting, but as there was not a quorum the special business could not be proceeded with. The object of the special meeting was—to consider, and if deemed advisable, to authorise the transfer of the shares numbered 11,876 to 16,675 inclusive, although no dividend in respect of the share capital of the company may have been first paid in accordance with the terms of a contract, and made between Edward Bishop, M.D., and the company; to consider, and if deemed advisable, to authorise the directors to raise further capital by the issue of debentures or otherwise, upon such terms as to the said meeting may seem fit; and to discuss generally the financial position and prospects of the company, and pass resolutions in regard thereto. Subjoined is the directors' report:—

The annual meeting of the shareholders of this company affords the directors the opportunity of reiterating their belief in the value of their property in Idaho, and, if sufficient working capital can be provided, of the success of their operations. The directors, who hold a large interest in the capital of the company, and who have paid the most unremitting attention to its affairs, feel equally with their brother shareholders the length of time which has elapsed since operations were commenced, and the small result hitherto obtained from the mines, but in a communication received from Mr. Mattingly he still considers that with a little further outlay success is certain, and it must not be lost sight of that his interest in the mines is so large there is every guarantee he will do his utmost to insure it; and, further, that until he brings the mine into a dividend-paying condition he receives no salary whatever, such being the agreement made with him when the mine was purchased, and which has been strictly carried out. Referring to the history of almost every mining operation, either at home or abroad, there appears to be a mistake invariably made as to the amount of capital required for working purposes, and it is on this account principally, even where a property is intrinsically good, that so many mining operations are doomed to delay, and even failure. This mistake has been made in our case, and the directors feel that the responsibility rests with Mr. Mattingly, who assured them the sum originally named by him would be sufficient. On the other hand, it would be unfair to him not to bear in mine that when a serious delay occurred in the development of the Stanley Mine, and there appeared to be some doubt as to the proper direction in which to find the lode again, Mr. Mattingly came forward and gave the company 640 ft. in another mine—the Leonora—which is admitted to be one of the most promising in the territory; and further than this, on a recent occasion when asked by the directors if he would give up 1000 vendors' shares to enable them to raise funds he did so without hesitation.

Notwithstanding these facts, and the belief by the directors in the *bona fides* of Mr. Mattingly, they do not wish to hide from the shareholders the opinion they have formed that he is not the best man they could have to superintend the reduction of the ores found in the Leonora and Stanley Mines, and that if a sufficiency of funds were at their disposal they would make other arrangements; indeed Mr. Mattingly himself some time ago suggested this in consequence of the remonstrances of the directors at the long delay that was taking place in bringing his operations to the promised successful issue. There is ample reason for the belief that by raising at the present time a little more capital the long-desired results of dividends will be obtained, but the general want of confidence in American mines has been, and still is, so great that the directors find the utmost difficulty in obtaining money even on the most tempting terms. Applications have been made in several quarters for a loan to aid this company, and two are still pending, by which it is hoped assistance may be obtained, and for this purpose, and the completion of the arrangements with the debenture-holders, the vendors shares, which were held in London by agreement until dividends were paid, should be set free, as it is impossible to obtain assistance in any quarter without giving a bonus in the shares of the company, and to do this it will be necessary for Mr. Mattingly to surrender some portion of the 5000 shares retained by the board.

It is quite useless to restate that the directors are satisfied as to the value of the company's property, but they wish it to be known that several circumstances have occurred within the last twelve months to increase this value, altogether independent of the developments effected under their manager's superintendence. One of the most important of these is the energetic manner in which the people of Idaho and Oregon are prosecuting their railway project for making a line of road connecting Portland with the Union Pacific at Ogden, which will pass within about 35 miles of Yuba, going through the centre of the territory of Idaho. This road will more than double the value of all real estate in Central Idaho, and more than quadruple the value of mineral properties in the South Yuba district, where this company's mines are situate. The great drawback to the working of the Idaho Mines is the difficulty of transit for food and materials, and the consequent high price of labour; but all this will be changed as soon as the Portland Dalles and Salt Lake Railroad is completed. Failing the success of the directors in obtaining a loan, or in getting subscriptions for debentures from the public, they will be compelled again to appeal to the shareholders to supply the required funds. They have themselves already subscribed considerable sums, and induced their friends to do the same, and they will have great reluctance in applying to them again; but as they have so large a stake in the property they will be serving their own interests, as well as doing their duty, in leaving nothing undone by which the success of the company may be effected, and they trust they will have the cordial and active support of the shareholders in their endeavours to secure this result.

The CHAIRMAN stated that the meeting had been convened to receive the report and balance-sheet, and also to transact certain special business, and it was in consequence of that that the meeting was called a month earlier than it otherwise would have been. As they had waited more than the half hour and still they had not the ten shareholders required to form a quorum, the meeting would, in accordance with the company's Articles of Association, be adjourned until the following day at the same time and place, and if there was not then a quorum the meeting would be dissolved. There was nothing, however, to prevent them from doing the ordinary business so far as to receive the directors' report and pass the accounts. Having read them the report he had but a few observations to make. Their difficulty had always been insufficiency of capital, but they started upon a different basis to other similar companies; indeed, they had gone upon the opposite principle. They determined that they would buy their property cheaply, and that they would buy chiefly for

shares, thus making the payment to the vendor dependent upon success. In their case, moreover, the vendor had managed the property and had received no salary whatever. Many of the shareholders, especially those who attended the meetings, had done much in the way of providing capital, but those absent had done but little. The directors could only place before the meeting the facts, and the question which the shareholders naturally asked was—How much money would be of any service to them? Some of their estimates had been exceeded, but they had not been supported to the extent they asked when making them. It was useless for them to expect to be in a strong financial position until the mine produces dividends. If they could keep the mine in a going condition until they were able to pay dividends, they would not require much money from the shareholders. Looking at it otherwise, they had endeavoured to obtain a loan, and had been to one of the joint stock companies, and placed their case before them. The answer was that they could do nothing without a fresh report. They learnt in one quarter that there was an opportunity offered of employing the services of a skilled man who happened to be engaged upon other business in the neighbourhood. They would have to pay the expenses, but could not obtain a definite promise that if the report were favourable a fixed sum should be advanced. He thought it was worth incurring the expense. He thought also that they could keep the company alive, obtain the report, and go on for a year with from 150*l.* to 200*l.* If each shareholder would subscribe 2*l.* it would give them 160*l.*; or if 6d. per share upon the shares issued were subscribed it would give them about 175*l.* He thanked the shareholders for their patience in waiting for a quorum, and concluded by moving that the report and accounts be received and adopted.

Mr. SHEPHERD seconded the resolution, and remarked that the subscription of 6d. per share appeared to be the most feasible suggestion, but he feared they could not enforce payment.——The CHAIRMAN said that they could not.

The report and accounts were then unanimously adopted, Messrs. Fowler and Tildesley re-elected directors, and a vote of thanks to the Chairman terminated the proceedings.

COLORADO TERRIBLE LODE MINING COMPANY.

The fifth ordinary general meeting of shareholders was held at the offices, Great Winchester-street, on Monday,

Sir CECIL BEADON, K.C.S.I., in the chair.

Mr. F. ANDREWS (secretary) read the notice convening the meeting.

The report of the directors (which has already appeared in the Journal) was taken as read.

The CHAIRMAN said that the circulars which had been issued from time to time as to the progress made at the mine had placed the shareholders in full possession of all the facts known to the directors; and, therefore, it was necessary for him to add but little. The great fact is that they had paid off the debt amounting to 13,000*l.*, and, notwithstanding that heavy burden, they had made a profit of upwards of 8000*l.*, although the whole has not yet been realised, for according to the assurances of the agent in a private letter addressed to him (the Chairman) a few days ago, the ore had been considerably undervalued. It was a great thing that they are now out of debt, and that nothing could occur to interfere with the prosperity of the company. The actual sales of ore in the year had realised 27,000*l.*—of that about 1000*l.* had gone to pay interest, and 13,350*l.* the expenses, the actual amount of ore taken out and the extent of work done is represented by 445 fms., against 414 fms. of the previous year. So that while the amount done was not much larger than the previous year the produce was considerably greater—for instance, there were 85 tons of first-class ore last year, and 423 tons the previous year; about the same quantity second-class, and 1350 tons third-class—being 500 tons in excess, and 752 tons of rock, against 403 the previous year. The ore sent to England had sold exceedingly well, and very much higher than their estimate—the average amount last year was 83*l.* 14s. per ton net, and that was the value then put upon the stock on hand; this year the actual amount realised had been about 137*l.* 8s. per ton, showing a very considerable improvement in the value of the mineral, as the workings in the mountain were increased in depth. The expenses as compared with the previous year were in reality very much less—the previous year the London expenses were 890*l.*, and last year 785*l.*; the interest the previous year 2400*l.*, and last year 1131*l.*; he was happy to say no such item would again appear in the accounts; the mining expenses being about the same figure as last year, notwithstanding a greater amount of work had been done. On the other hand, 10,248*l.* had been realised for first-class ore, 16,000*l.* for second-class—the average for the latter having been 25*l.*, against 17*l.* per ton the previous year. Within the last few days a telegram had been received from Mr. Teal, dated June 20, to the effect that the mine continued to look well, that concentration had started, and that good shipments would follow. Considerable expense had been incurred in erecting these concentration works; they would be actively worked by water-power, and there was a large quantity of ore that would be then treated, and would yield very good results. Reviewing the condition and prospects of the mine, he had no doubt that the results of the present year would be very satisfactory to them all. (Hear.) He then read extracts from a letter he had received from his son, who had been working in the Colorado Terrible Mine, but is now engaged in a neighbouring property. The letter stated:—

"I was all through the Terrible with Harry Lampshire the day before yesterday, and I can only say, as I have said before, the mine is looking splendid. The shaft is down from the bottom of 6th level about 40 ft. The new party are pushing men, and are going ahead very rapidly, and, with ordinary luck, another five months will see it down and timbered, and the 7th level drifts started. They have a vein of rich ore nearly 1 foot wide in the bottom, which, if it continues, will pay for the sinking, and, I should think, give considerable profit. In the breast of 6th level drift they have just come into about 8 in. of mineral, in which there is considerable brittle silver. The two stopes in this level have also good pay in them. The winze now sinking from 5th level to 6th has a good vein of ore all the way as yet. It is now down about 30 ft."

The CHAIRMAN added there was reason to hope that, as the vein in the bottom of the shaft was looking better than in any other part of the mine, the deeper the explorations were extended—as, indeed, all previous experience had proved—the larger would be the returns, and the richer the quality of the mineral. He then moved that the report and accounts be received and adopted.——Mr. EMMENS had much pleasure in seconding the proposition.

A SHAREHOLDER asked whether any of the amount realised for ore sold in Colorado had been retained in Colorado, or whether any had been sent to England?——The CHAIRMAN: That is all retained out there—the expenses out there were about 13,000*l.*; 12,000*l.* had been realised by the sale of ore there, and 1000*l.* sent out.

Mr. SMYTH said very few companies had greater reason to be satisfied with the successful way in which their affairs were conducted, either by the directors at home or the management of the mine, and there were still fewer companies who having raised money upon debentures had ever paid them off. Last November twelve months they owed 9800*l.*, besides 7000*l.*—all this had been paid off, which all must admit was a great cause for congratulation. Some shareholders might imagine a dividend of 1s. 6d. per share was rather a small one; but if they looked over the balance-sheet they would find a credit for 8600*l.*—so that he should like to propose, instead of having this 1s. 6d. per share at once, they should wait another fortnight or three weeks, when the forty-first shipment of ore would have been realised, and make the dividend 2s. 6d. per share.

The CHAIRMAN explained that the directors had considered the matter of the dividend, and the reason which had actuated their recommending a smaller dividend, instead of waiting for a larger one, was this—they had a large constituency in the country, who had not the opportunity of being represented in London, and who were not so well acquaintained with the position of the company as the gentlemen present. They had been waiting for a dividend for a long time, and the board had been led to believe it would be very satisfactory if a dividend were now announced. He was inclined to think this was a right decision; but, of course, it was for the meeting to determine. The directors thought, on the whole, it would be better to declare the small dividend, and put off any further dividend for three or six months. With the mines extending, and the produce improving, and with the additional assistance of the concentration works operating upon this large mass of rock, they would probably in the course of time be able to give large dividends; but he thought it would be more satisfactory to a great body of shareholders if the smaller dividend were declared now.

The CHAIRMAN, in reply to further questions, said there was no fear whatever of getting out of funds. The forty-first shipment had been assayed in Colorado, and had given 461 ozs. of silver—so that it might be calculated roughly as worth 115*l.* per American ton, and the shipment would realise about 1200*l.*

The resolution adopting the report and balance-sheet was put and carried unanimously.

Upon the proposition of the CHAIRMAN, seconded by Capt. DAVIS, a dividend of 1s. 6d. per share was declared.

Messrs. A. R. Young and R. M. Witham were re-elected directors.

Messrs. Colvin and Marshall were re-elected auditors; and, upon the proposition of Mr. HANKEY, a unanimous vote of thanks was passed to them for their gratuitous services.

A vote of thanks to the Chairman and directors terminated the proceedings.

The CHAIRMAN said that, as the business of the meeting had been concluded, he wished to inform the shareholders that with a view to improve the property the directors had had under their consideration a proposition to purchase 500 ft. of the mine belonging to the Clark Mining Company. Probably they were aware the Colorado Company's property consisted of 800 ft. to the west of Discovery shaft, and 300 ft. beyond the Clark Mine—the latter, comprising 500 ft., being situated between the two locations; that is to say, the property of the Colorado Company consisted of 800 ft. on one side and 300 ft. on the other side of the mine belonging to the Clark Mining Company. From the commencement of the operations at the Colorado Mine there had always been a talk about their buying the 500 ft. forming the property of the Clark Mining Company, but the price asked was so enormous that it was quite out of the question. The price originally asked was 60,000*l.*, but there was now reason to believe it could be purchased for 20,000*l.*; and if the vendors would accept the amount in shares of the Colorado Company it would be very much to the interest of the company to authorise the directors to increase the capital to that extent, because it was in effect not only purchasing the additional 500 ft., but, at the same time, of utilising the 300 ft. now unavailable for all practical purposes. This matter could not come before this meeting, because no notice had been given of it; but, if the negociations now going on should prove satisfactory, the directors would probably call a special meeting for the purpose of considering the proposal. It was very difficult for anyone to work so small a property as 500 ft., but there was every reason to believe it was just as valuable if not more so than the 800 ft. they were now working. It was of the greatest possible importance this company should be able to extend its operations; the difficulty they had with the 800 ft. was that they could not develope it fast enough for want of sufficient surface accommodation: they could now only stope about 500 fms. in the year, whereas they ought to be able to stope 800 or 1000 fathoms. If they had this additional ground they would increase the product of the mine without any material increase of expenditure. The raising of the capital from 105,000*l.* to 125,000*l.* would not have a very large effect upon the dividends, whereas the result would more than compensate for the difference by the advantages to be derived from the additional 500 ft., and the facility thus given to utilise the remaining 300 ft.; but the directors would take no steps to commit the company without the consent of the whole of the shareholders.

Upon the proposition of Mr. COLVIN, seconded by Mr. HANKEY, a unanimous vote of thanks was passed to the Chairman and directors, which closed the proceedings.

EMMA SILVER MINING COMPANY.

The adjourned meeting of the shareholders was held at the Cannon-street Hotel, on Tuesday (Commissary General GARDNER in the chair), for the purpose of declaring the result of the poll relative to the election of a director. It will be remembered that at the meeting held about three weeks ago Mr. Alexander McDougall was proposed as a director, to which resolution an amendment was proposed that Mr. Ex-Sheriff Hutton be elected on the board instead of Mr. McDougall. On a show of hands Mr. Hutton was declared elected by a large majority, and a poll was demanded on the part of Mr. McDougall. A poll was also demanded on the question as to whether there should be an increase in the number of directors.

The meeting was called for twelve o'clock, but it was half-past twelve before the proceedings commenced, when

The CHAIRMAN rose and said: Gentlemen, I am very sorry we are kept so long, but the scrutineers have had a very troublesome task, and they have only just finished it.

Mr. A. McDOUGALL asked the Chairman whether he had received any protest against the poll?——The CHAIRMAN: You are out of order, Mr. McDougall. I must request you to sit down.

Mr. McDOUGALL: I must ask you whether you have received any protest against this meeting? I ask that as a shareholder.

The CHAIRMAN: Will you be good enough to sit down? We are assembled here for a special purpose, and that is the declaration of the poll. I will now read the report of the scrutineers.

Mr. McDOUGALL then handed in his protest against the poll.

The report of the scrutineers was then read by the Chairman, as follows:—

"As to the poll taken on the amendment that Mr. Hutton be a director, total number of votes taken personally in favour of the amendment, 643; proxies in favour, 19,855; total for the amendment, 20,498. Of these we agree must be struck off 398, leaving a balance, subject to objections stated below, of 20,100; total number of votes tendered personally against the amendment, 1025; proxies against, less those we agree must be struck off, not exceeding 9721; balance, subject to objections stated below, 10,746. Objections by Mr. Greenip:—(a) proxies in favour of General McCrea, on similar grounds as Mr. Anderson, 205; (b) proxies in favour of Mr. George Anderson on the ground alleged that he did not vote on them, 158; (c) to the whole of the proxies on the ground in the form prescribed by the Articles of Association; (d) to so many of the proxies as are in favour of General McCrea and Mr. Wood jointly on the ground that General McCrea was present and did not, in respect of his proxies, and that Mr. Wood had no power to vote. Objections by Mr. Wood to the votes by proxy against the amendment for want of sufficient stamps, 3256. As to the poll taken on the resolution proposed that the number of directors be increased to 7—total number of votes tendered personally in favour of the resolution, 1585; proxies in favour, less those we agree should be struck off, not exceeding 9061; balance in favour, subject to objections, 10,746; number of votes tendered personally against the resolutions, 710; proxies against, less those we agree should be stauck off, 19,395; balance against, subject to objections, 20,100. The same objections as are above stated to the proxies against the before-mentioned amendment apply to the proxies for the resolution and the objections to the proxies, for the amendment apply to the proxies against the resolution. Assuming that the above-mentioned figures stand, the result of the polling is that the amendment to the first resolution is carried, and the second resolution lost. But assuming further that the objections raised by Mr. Greenip are well founded, the result would be reversed."

Mr. SNELL said there were other points and other objections, and it was not fair that the objections should go to the public in the form in which they had been read by the public.

The CHAIRMAN said he overruled the two objections; the one was that the whole the proxies were not in form, and the other that Mr. Wood and Mr. McCrea were present and did not vote. He, therefore, declared the amendment carried. As regarded the resolution, the same remark applied to that, and he declared that the resolution was lost, on the same grounds that he declared the amendment carried.

Mr. GREENIP wished to know on what grounds?——The CHAIRMAN: I overrule your objections.

The CHAIRMAN then declared the meeting over, and, turning to Mr. Snell, said: Any steps that you choose to take you are aware you can take.——Mr. SNELL: I thank you. (A laugh).—The meeting then terminated.

BURROW AND BUTSON MINING COMPANY.

The half-yearly general meeting of shareholders was held at 21, John-street, Adelphi, on Tuesday,

Mr. J. W. WILLIAMSON in the chair.

The SECRETARY read the notice convening the meeting, and the balance-sheet to Dec. 31 last, showing a credit balance, consisting of cash at bankers' and in hand, and calls due on shares of the first issue of 868*l.* 3s. 3d., together with the report of Mr. H. Von Uster, F.G.S., the consulting mining engineer, and Capts. Christophers and Mayne, prepared for presentation to the meeting, were submitted. Subjoined is the report from the mine since received:—

June 29.—Your letter of the 27th is to hand, so I will try to give you the size of our lodes as near as I can. In the 62, going west, we are driving by six men, at 8*l.* per fathom; the lode is 3 ft. wide from foot to head wall, and is composed of quartz, capel, and stones of blende, copper, and mundic. The underlie of the lode in this level is 2 feet 10 inches, and looking very kindly for copper, as the ground is much lighter in colour than it has been in the past, and I am looking for this level to improve daily for copper, as we are driving to meet the course of ore that is dipping east from Wheal Butson. In the 40, west of engine-shaft cross-cut, we are stoping in the bottom by four men, at 4*l.* per fathom; the lode is 4 ft. wide, the underlie 3 ft. in a fathom, and composed of spar, capel, and a leader of blende and copper together, very near clean, about 1 ft. 3 in. wide, worth 2 tons per fathom for copper and blende—that is in the footwall part of the 4-ft. lode, as you have above. In the 40, east of engine shaft cross-cut, we are clearing by two men to get under the course of blende that we are working on. In the 30, west of Tonkin's, we have made good progress since we have commenced to clear. But we are now into a breakdown in the back of the level, but I hope it will not last long; the lode, as far as I can see this morning, is about 3 ft. wide, underlying about 3 ft., composed of spar, capel, and a leader of blende about 6 in., and I am looking for this to improve as we go east, as it is much better than that in the level above. In the 30, west of Tonkin's shaft, we are stoping by six men, at 3*l.* per fathom; the lode is 5 ft. wide, underlying about 3 ft. in a fathom, composed of two leaders of blende, the one about 1 ft. wide, and the other about 6 in. wide—that is, one near the footwall and the other about 1 ft. off the headwall. The balance of the lode is spar and capel, with a little peach in it. This lode is worth fully 2½ tons of blende per fm., as it is at present. In the 30, east of Tonkin's, we are driving a cross-cut by four men, at 8*l.* per fathom, to intersect the north or lead lode that is standing in the level above, about 2 fms. north of the main lode, and we think is going a little further apart as it goes down. We are in now about 3 fms.; we do not see it as yet, but are looking for it daily. In the 20, east of Tonkin's, we are driving by four men, at 3*l.* per fathom, underlying about 3 ft.; this is the north, or lead lode; the lode itself is about 4 ft. wide, composed of one vein or rib of lead about 1¼ inch thick, and another of blende about 4 inches thick. The balance of the lode is peach and flookan, mixed up with killas—a very pretty lode for lead. In this level we have gone through some good lead ground, and are looking for further improvement, which I think we shall get soon, as we are in very near under the place where the old workers had a good lode of lead in and above the adit. But they worked up and took it away, and worked down as far as they could, so that we cannot do anything with it from the adit level, but we must come in at the 20 fathom level, then we shall see what we have there. In the 20 fm. level, west of engine-shaft cross-cut, we have cleared up to the end of ground, and are now driving it by four men, at 7*l.* 10s. per fathom; the underlie is about 2 ft. 6 in. in the fathom; the lode is about 5 ft. wide altogether, composed of spar and capel, with a leader of blende and copper about 6 in.; I think it is improving this last 3 ft., and hope it will continue to do so. Our new dressing machinery is all here, and we are going on with putting it in as fast as possible. All other things are working well throughout our mines.—JOHN CHRISTOPHERS.

The CHAIRMAN said that the business upon which the shareholders were called together was that of an ordinary half-yearly meeting, and the directors were desirous of laying the accounts before them, and put them in possession of all the facts with regard to the progress of the mine. In all classes of mining those concerned had had great difficulties to contend with, in consequence of the great depression which had prevailed and the excessively high prices which they had had to pay for every description of material as well as for coal. Indeed, he might tell them that last autumn, when he had occasion to visit Cornwall, the depression was so severely felt that several persons did not hesitate to express to him the opinion that unless there was a great change within twelve months there would not be a tin or copper mine working in the county. He might congratulate them that theirs was not a copper or a tin mine, but a lead and blende mine of considerable value. A year ago they were in financial difficulties, but one of the large shareholders had come forward most handsomely, got them out of their difficulties, and placed the undertaking in a thoroughly sound financial position. Yet this gentleman was acknowledged to be a sharp man of business, and it was unreasonable to suppose that a man of his shrewdness would put his own money into any concern which was likely to prove unsuccessful. For his own part he regarded the assistance thus rendered to the company as an earnest of the shareholder's entire confidence in the enterprise, and it should be considered as such by the other shareholders. In addition to the low prices ruling in the metal markets, the company had had some difficulty to contend with in separating the blende from the other materials with which it was mixed, and thus rendering it fit for market; but he believed that difficulty had now been completely remedied. They cleaned up the mine when they first took possession, but found that, the price being only 50s. per ton, it was not worth while to raise it and send it to market, as it cost them 2*l.* per ton, and then they had to risk the cost of carriage before they could sell it. At the present price blende would fetch 4*l.* per ton, which would leave them a good profit, and as the market was improving they might expect it to go to 6*l.* per ton; at 4*l.* per ton, however, they would have but little to complain of. They believed that they had a really good mine, and it could not be in better hands than those of their managing director. Under him the mine had been economically, efficiently, and admirably worked; in fact, no mine was in a better position, whether considered as to locality, machinery, or finance. They had an abundance of blende which they could now sell at a profit, but he hoped it would turn into a lead lode. Under any circumstances, he thought it probable that as they got deeper they would get more lead. Prices varied very much, and for this reason they had discussed the question whether they could not smelt their own ore. Of miners and workmen they had a full complement, and Captain John Christophers, their principal agent, was as honest and hard-working a man as could be found; they had, moreover, first-rate machinery, and were not in want of funds. He believed he had mentioned every point of interest to the shareholders, but would be happy to supply any omission by answering whatever questions which might be put. He concluded by moving that the accounts be received and adopted.

Mr. C. MORRIS seconded the motion.

Mr. H. VON USTER, F.G.S., remarked that the report received at the office that day fully confirmed that which had been forwarded to the shareholders with the notice convening the meeting; the only difference being that the several points looked somewhat better. It had been suggested that they might have had specimens of the lead upon the table, but their managing director considered that it might appear that they were too desirous of making much display, and that it would be better for the shareholders to see them at the company's offices. He might however, mention that the lead was 10 in. wide, and nearly solid, being worth 75 per cent. for lead. They could see the foot-wall and hanging-wall on the sides, which proved that it was not an isolated specimen, but part of a true lode. The Chairman had entered so fully into all particulars with regard to the progress of the mine that it left but little for him to say. Their agents would have attended the meeting as usual, but they were at the moment too fully engaged, new machinery being on the mine, and Capt. Christophers could not be spared, as they were pressing on to get it ready. They sold one parcel of blende which was lying at Truro for 127*l.*, which would with the other sales come into the next accounts. The engine-shaft had been sunk between copper and lead; on the east of the shaft they had had lead, and on the west copper. They were now driving the 20 east, and stoping. They had some lead, and hoped every day for improvement. The bottom level had been temporarily suspended, because the funds were short, but would now shortly be resumed. Many persons stated that the lead in their ground was dipping towards their shaft, which would be a great advantage, but he was not prepared at that moment to say positively that it was doing so. He felt sure that their bottom level would bring them into good ore ground, and he was glad to say that the price of copper was improving, and that the copper ore from the Burrow and Butson had always had the reputation of being the richest in the neighbourhood. The Chairman had very kindly referred to Capt. Christophers' valuable services, and he could fully confirm all he had stated. He had observed his good qualities in the adjoining mine, Great West Chiverton, and in consequence promoted him to his present position. With their new machinery they would be able to dress and sell both blende and copper regularly, and they would not be under the necessity of wasting their blende on the copper smelters, and their copper on the blende smelters. He regretted the comparatively small attendance of shareholders, but might explain that it probably arose from the meeting having been inadvertently fixed for June 30, a day upon which many of their London shareholders, being connected with banking business, could not attend.

Mr. R. A. HILL had noticed that the price of blende was quoted 5*l.*, or some other price per ton, and would be glad to know to what percentage of metal the quotation referred?——Mr. VON USTER said that the average percentage of the blende was 50 per cent. He might mention that in their case they would get their absolutely clean blende upon very favourable terms, for they estimated that the copper and sulphur obtained would pay the whole cost of separation, or, at all events, it would not cost them more than 1s. per ton to make it ready for market. If the blende were clean he did not doubt that in a short time they would get 6*l.* per ton for it, at which price the company would obtain a large profit. He believed that within twelve months the shareholders would be congratulated upon their very favourable prospects. The question of smelting their own ore had been discussed, but it was not considered advisable at present; if, however, the blende smelters were too illiberal the shareholders might determine to form an independent company to provide the necessary means for doing so.

Mr. JOHN SELBY enquired whether any of the shares of the company had been given away as free shares? and also complained that the amount of a call which he had paid for his daughter was not included in the accounts.

The CHAIRMAN said that there were no shares which had been given away; but that there were the shares paid to the vendor as part of the purchase price, upon which the company had not actually received cash. As to the payment which Mr. Selby referred to, he would remind him that the balance-sheet only extended to Dec. 31 last, and his payment would be regularly shown in the next balance-sheet.

Mr. SELBY was quite satisfied with the explanation, but did not think the matters were clearly shown in the balance sheet.

The CHAIRMAN remarked that the balance-sheet was drawn by Messrs. Harding, Whinney, and Co., and audited by the shareholders' auditor, and it was explained in the first paragraph of the directors' report that there were open accounts which would be adjusted in the next balance-sheet. He was, however, glad for any shareholder to make enquiries upon any point not clear to him.

Mr. E. WHITTLE did not see any item for ore sold from the mine, nor estimate for ore raised, although he understood long since that there was much on the mine.

The MANAGING DIRECTOR said that as to ore sales there had been none until since the date at which the accounts before them were closed. The balance-sheet showed their actual position at Christmas last. As to the ore raised, he considered it ought not to appear in the accounts until it was really sold, and so long as he remained managing director ore sales would not be brought into the balance-sheet until the money was actually realised. He would do precisely the same in his own business, but there would always be differences of opinion as to accounts.

Mr. C. MORRIS remarked that it was not unusual in mining companies' balance-sheets to estimate the value of ore on hand.——Mr. VON USTER said that there was ore on the mine at the date of the previous meeting, but as the price was very low the directors decided not to sell.——The MANAGING DIRECTOR said that blende had been sold since the date of the balance-sheet, and would duly come into the next.

The CHAIRMAN, in reply to questions from shareholders, stated that about half of the price of the machinery had been paid, and about 300*l.* remained to pay. There was about 800*l.* due from shareholders, most of which was secured, and the whole was considered by the board to be perfectly good debts. They had no thought at present of forfeiting shares, as the directors always considered it preferable to suit, as far as possible, the convenience of shareholders. Were they in immediate want of funds they might be compelled to act more stringently.

The motion for the reception and adoption of the accounts was then put to the meeting, and carried unanimously.

Mr. Charles Morris was re-elected a director, upon the proposition of the CHAIRMAN, seconded by Mr. THOS. MILNES; and, upon the proposition of the MANAGING DIRECTOR, seconded by Mr. C. W. NICHOLS, the Chairman was re-elected.

A cordial vote of thanks to the Chairman, proposed by Col. JERVIS, and seconded by Mr. W. T. NELTHROPP terminated the proceedings.

PROVIDENCE MINING COMPANY.

At a meeting of adventurers, held on June 24, the accounts showed a debit balance of 2632*l.* 13s. 2d. A call of 2*l.* per share was made. In consequence of the extension of the working of the mine and the employment of a greater number of hands the duties of the manager, Capt. Hollow, having been considerably increased, and it being found necessary to appoint a second agent to assist him, it was resolved that Capt. Hollow's salary be 120*l.* per year from the next pay-day, payable monthly, his engagement to be determinable on either side by one month's notice from any pay-day. Capt. Samuel Rogers was re-apppointed agent, at 91*l.* per year, his engagement also to be determinable on either side by one month's notice from any pay-day: 36 shares were relinquished. The following report was read:—

June 24.—The Standard lode in the 85 east is small and unproductive; now being driven by four men, at 8*l.* per fathom. There are 15 fathoms more to drive to get under some good tin ground gone down below the 75. In this level north we are opening the end by four men, on a lode going 20° east of north; this is being done instead of driving the cross-cut north; it will prove the tin ground now being stoped in the back on the same lode by six men, at 4s. 6d. in 1*l.* tribute. The lode in the winze sinking below the 85, on No. 3 lode, is 2½ ft. wide, worth 15*l.* per fathom; now being sunk by four men, at 12*l.* per fathom. The lode in the winze sinking below the 75, on No. 3 lode, is 2 ft. wide, worth 25*l.* per fathom; now being sunk by four men, at 10*l.* per fathom. The south lode in the 75, driving east, is 3 feet wide, worth 20*l.* per fathom; driving by four men, at 11*l.* per fathom. There are six men in the back of this level on tribute, at 4s. in 1*l.*; this lode is not worked below the level, and is the tin ground referred to at the 85 east. The north lode in the 75 is 3 ft. wide, worth 20*l.* per fathom; driving by four men, at 15*l.* per fathom. Hawke's shaft is complete to the 36, and skip-road fixed. The 26 is driving west by two men, at 5*l.* per fathom; the lode is 1½ ft. wide, of low quality. There are four men in the back of this level, at 7s in 1*l.* tribute. The 14 is driving west by

two men, at 4*l.* 10*s.* per fathom; the lode is 1 ft. wide, worth 4*l.* per fathom. There are 18 pitches working on tribute by 58 men, at an average of 10*s.* in 1*l.* at the present price for tin, and 35 on tutwork; total underground, 93. From the present appearance of the mine if tin does not recede in price I think we can pay cost.—WILLIAM HOLLOW.

WHEAL JANE MINING COMPANY.

At a meeting held at the mine, on Thursday last, a profit was shown on the three months' working of 219*l.*, which left a credit in favour of the adventurers altogether of 251*l.* The labour cost for February, March, and April was 1794*l.*; bills, 93*l.*; and dues, 173*l.* On the other hand, the credits were 3126*l.*, leaving a profit on the 27 tons of tin stocked from March last of 135*l.* There are 55*l.* tons of tin on the mine credited in this account, also not sold, at 5*l.* per ton, amounting altogether to 297*l.* This makes 82 tons of tin credited and not sold, and computed at 442*l.* Against this they owe to merchants 153*l.*; to their bankers, 219*l.*, and other liabilities. Mr. Alfred Lanyon has relinquished 32 shares. It was proposed by Mr. Hawke, seconded by Colonel Perceval, and carried unanimously:—"That the statement of accounts as read, showing a profit on the three months' working of 219*l.*, together with 32*l.* brought from last account (making 251*l.*) be carried to the credit of the next account." It was also resolved that the thanks of the meeting be accorded to the committee for the course they have taken in continuing the working of the mine, &c.; that the tin be still placed at their discretion for disposal; and that in the interim they be empowered, if found necessary, to overdraw the account with the Miners' Bank another 200*l.*, in addition to the 300*l.* The agents reported:—Since the last general meeting our tutwork operations have been confined to the working of two bargains. The Tremayne adit level is extended west from shaft 104 fms.: the lode is 1 ft. wide, and worth 20*l.* per fathom, driving by three men and three boys, at 8*l.* 8*s.* per fathom; this end is now about 7 or 8 fms. above a pitch, working by 12 men, at 4*s.* 6*d.* tribute. At this point we have every reason to expect a long and lasting bunch of tin, as it has continued from the 60 fm. level up. The deep adit level rise is now up 5 fms.; the lode is 6 ft. wide, and worth 8*l.* per fathom, rising by three men and three boys, at 7*l.* per fathom. We anticipate a good lode in this rise, as it is going up in the run of tin ground above. We have nine tribute pitches working, from 4*s.* 6*d.* to 13*s.* in 1*l.* In the past three months we have considerably curtailed our tutwork and other expenses, and with the low standard several of our old pitches have not been able to be worked; yet we are glad to say our tin has fallen off but little in quantity. With a few pounds' advance in the price of tin, this mine would at once take its former position as a dividend-paying mine.

The committee reported as follows:—After such an unprecedented and disastrous quarter of a year as tin mining has had to pass through, bringing destruction to many mines, and threatening the existence of almost all, it is a real pleasure to the committee to be able to address you once more from this account house as your representatives, and to refer to the course of their proceedings since they met you at the very discouraging meeting on the 29th of March last, when, on the presentation of their report, they were authorised by a resolution of the meeting to suspend for a time all further working of the mine, to which they hastened to give effect by giving the usual month's notice to the whole of the people under your employ; but before the expiration of which indications of improvement in the tin market began to manifest itself. The committee then, under these more auspicious circumstances, held a consultation with the agents, who, with themselves, were unanimous in considering it to the last degree expedient to continue the limited operations of the works for at least another month rather than closing the concern altogether, and sending old and deserving servants all over the country, never to be got together again; this course affording also opportunity for the development of the tin trade, which happily has now become more encouraging, though, of course, leaving plenty of room for further improvement. By this procedure they have been able to work the mine, not only without loss, but to some profit, even with tin at only 54*l.* per ton, as you heard by the accounts just read, but you will observe the tin is only credited, not sold, and in addition to the 27 tons in March, Capt. Hall has dressed and put to the tin house this quarter 55 tons—making the entire stock 82 tons. The committee trust the course they have pursued under the late trying and perplexing condition of the tin market will meet with your approval, and they now ask for the expression of your opinions thereon for their government; and as it may be sound policy to still continue holding the tin for a time longer, you will perhaps authorise the committee, if found necessary in the interim, to further overdraw the account at the Miners' Bank another 200*l.*, in addition to the 300*l.* already authorised, placing the tin for disposal at the direction of the committee.

WEST CHIVERTON MINING COMPANY.

An extraordinary general meeting of shareholders was held on the mine on June 27—Mr. A. C. GLUBB in the chair.

The usual preliminaries having been disposed of, the accounts for the 16 weeks ending April 25 were submitted, showing a loss on the working of 95*l.*, and a credit balance of 138*l.* were presented, and the subjoined report from the agents submitted:—It stated that the ground in the new engine-shaft was more favourable for sinking, and they hoped to make good speed in getting to the 150. The 140, west of new engine-shaft, has improved very much in the past three weeks, and is now worth 25*l.* per fathom. A winze sinking below the 130, ahead of the 140 end, is worth 30*l.* per fathom, and from present appearances no doubt is felt that a profitable piece of ground will be opened out here. After referring to other points of operation the report concluded:—"You will see from the accounts our returns during the past quarter have been increased, although the 140 fm. level up to this time has not opened out to our expectation; and, judging from the ore ground gone down in the bottom of the 130, we see no reason to doubt that the returns during the coming quarter will still be further increased."

The CHAIRMAN explained that at the previous meeting a resolution was passed authorising the purser to overdraw the banking account to the extent of 2000*l.* or 3000*l.* This resolution was neither good in policy or law, and the bankers declined to allow anything like a permanent overdraw. The purser wanted betweeen 2000*l.* and 3000*l.* immediately, and as he could not obtain it from the bank he thought his only alternative was a call, and he could not get a call made unless he gave notice of it. He was perfectly aware of the difficulty there would be in collecting a call if one were made, seeing that the shareholders, numbering 330, were scattered all over the world, and it was not without a good deal of consideration that he inserted the words in the notice that a call would be made if necessary. The same bankers have had the account from almost the commencement of the mine; the turn over has been something like 70,000*l.* a year, and recently they had been paid about 400*l.* a year for interest and commission. It was a little surprising the accommodation asked was refused, as there was about 4000*l.* worth of ore bills coming to hand in a week or two. But he would point out that although the bankers might refuse any permanent overdraw, they perhaps would not refuse a temporary overdraw in the face of these bills. If they did so the account would have to be withdrawn.

Mr. GRANVILLE SHARP, who held nearly half of the proxies (between 600 and 700 shares) represented at the meeting, enquired whether they hoped to meet cost, as he considered that if they went on as at present a call would be inevitable? He thought the mine had been worked for the shareholders in Cornwall exclusively.

Mr. BLAKEY, of Leeds, remarked that the price of coal had gone down, and enquired whether they had plenty of labour?——Mr. V. PEARCE said that the Cornwall Minerals Railway had discharged a large number of hands. They were now very much better for labour, and the men were settling down.——Mr. BLAKEY enquired the value of the reserves, as he had heard the mine had been worked unfairly, though he must say from the enquiries he had made he believed the mine was honestly worked. If coals came down in price and had improved they would go on well.

Mr. CLOGG said the average price of coal last quarter was 17*s.* At present they only owed the bank 270*l.*, and they had paid one month's additional cost—158*l.*—the previous Saturday. The May costs were not included in the accounts presented ——Mr. PEARCE supposed the bankers would not advance another shilling, and feared they were leaning upon contingencies; but at the end of the next three months they might be worse off than now. And if the bankers would not advance them another penny, how did they propose getting the money to carry on the mine?——Mr. CLOGG remarked that that was the very point that required their careful consideration at the present time. They wanted 800*l.* immediately for dues which should have been paid before; they also owed 1100*l.* to merchants, and in the next fortnight they would have to pay 300*l.* or 400*l.* for coals. They were really indebted 1858*l.*

Capt. JULEFF believed they would very nearly meet costs. They hoped to open out some good ground, but the great thing against them this quarter had been that the lead had gone down in price, an average of 1*l.* 6*s.* 6*d.* per ton, and that upon 519 tons makes a difference. The jack made 130*l.* less. The mine itself is producing a fair quantity of ore. They had reserves, and were making reserves, but he had not calculated the amount. There had not been an ounce of ore taken out unfairly. After calculating, he said they had 20,000*l.* worth of reserves, against 35,000*l.* twelve months since. He could not suggest how they could much reduce expenditure underground, but four or five surface men might be dispensed with. He considered the stamps better for their purpose than the crushers; they were obliged to bring down some ore finer than the crushers would bring it, in order to get the lead out of it. Every item in reference to the stamps had been kept separate to show the profit. They had sold 690*l.* worth of lead from the stamps, and the cost of preparing it was about 20 per cent. of that amount. The large heaps of refuse which they were putting through the stamps were not nearly exhausted.

Mr. SHARP would like two thoroughly practical and independent men to inspect the mine—to have a thorough inspection of it, and to take time to do it. He knew that would be the wish of the shareholders whom he represented, and he proposed that such a course should be adopted—not out of any want of confidence in their present managers, but he thought it would give greater confidence to outside shareholders.——Mr. WOODWARD seconded the resolution. He believed they had confidence in the agents, but, at the same time, the adventurers had been disappointed at not getting any dividends, and if the mine was inspected by well-recognised practical authorities, he thought it wouldmaterially enhance the value of the property, and restore faith in the management.

Mr. BLAKEY said the fear had arisen chiefly from the large number of Cornishmen that had gone out of the mine who had derived the profit out of it. That made people think things were not as they should be, and had, perhaps, given rise to rumours that were not correct. If the report of their agents were confirmed it would be all in favour both of the managers and their mine. He had no fear but that they would be confirmed, as he had the fullest confidence in them. He seconded the proposition, and it was carried unanimously.

Capt. Josiah Thomas and Capt. Thomas Richards were the gentlemen named for the duty, and Mr. Sharp intimated that he would appoint Capt. Southey to inspect the mine for him.

Mr. CLOGG, with reference to the financial position of the mine, said that they must by some means endeavour to raise nearly 2000*l.* immediately.

Mr. SHARP spoke in strong terms of the action of the bankers, who, he said, had made a very good thing out of them, but now that they were pinched a little refused to accommodate them. It was only a temporary overdraft that was required, and he saw nothing to warrant such a course of action.

Capt. JULEFF said he did not think they should make a call at present. They were likely to increase their returns, and they would have regular sales of ore.

The CHAIRMAN thought the bank would not refuse to advance the money required with these bills before them, although they would not permit a permanent overdraw. It was ultimately resolved that the purser be authorised to withdraw the account if the bank refused to advance the money required, and obtain it on the bills from another bank.

The PURSER then stated that he had heard nothing definite in answer to the application for a reduction of dues, but Mr. Downing had informed him that he did not anticipate the question would be considered until the annual meeting of the lords, in November. Mr. Downing had also told him that he did not think the lords would re-open the question of the premium.

On the motion of Mr. SHARP, it was resolved that all future meetings should be held alternately in London and on the mine, and the next meeting should be held in London.

The business having been concluded, the adventurers dined together, and the agents in responding to the toast—"Success to West Chiverton"—spoke very confidently as to the future of the mine; and Mr. SHARP and Mr. BLAKEY, in acknowledging the toasts of their healths, stated that the meeting had resulted in a much more satisfactory way than anticipated, and they would be able to give an encouraging report to their friends.

LLANHARRAN COLLIERY COMPANY.

The ordinary general meeting of shareholders of this company was held at the offices, 110, Cannon-street, on Tuesday,

Mr. A. BARLOW in the chair.

The report of the directors, which was taken as read, stated that, including the amount payable to the vendor in shares issued and fully paid-up, 60,080*l.* of the capital of 75,000*l.* had been allotted, and the remaining 14,920*l.* would be offered to the shareholder as occasion required. Warrants for the interest guaranteed by the vendors, and payable to June 30, would be issued on the 30th inst. The works were being constructed as rapidly as possible, and due provision was being made for a large output of coal. A stone quarry contiguous to the mine had been acquired free of royalty for the company's use, which would be of great advantage in the construction of the works.

The CHAIRMAN, in moving the adoption of the report, congratulated the shareholders upon the prospect before them, mentioning that since the report had been issued they had struck a seam of upwards of 6 ft. thick, the coal from which appeared to be very good, and he had no doubt that they would get for it a ready sale.——The motion was seconded by Mr. BROWSE, sen., and carried, after which the retiring directors and auditors were unanimously re-elected.

The meeting was then made special, when a resolution adding to the title of the company the word South was passed. This change was rendered necessary, from the fact of a private company trading in the immediate neighbourhood under the title of the Llanharran Coal Company, and thereby causing some inconvenience to this company.

The proceedings were brought to a close with the usual vote of thanks to the Chairman.

WHEAL AGAR MINING COMPANY.

At the general meeting of shareholders, held at the offices of the company, Cornhill, on Wednesday (Mr. JOHN WESTON in the chair), the accounts for 12 months, showing a balance due to the bankers of 477*l.* 8*s.* 3*d.*, were passed, and a statement of liabilities and assets, showing a balance against the adventurers of 3091*l.* 0*s.* 6*d.*, was also submitted. To meet this liability a call of 8*s.* per share was made.

The CHAIRMAN stated that no meeting had been held since July 1, 1873, in consequence of the limited operations that had been carried on pending a settlement of the water question with East Pool Mine. He was happy to say that litigation had been avoided, and that the appointment of two gentlemen to arbitrate on the difficulty between the two mines had resulted in a satisfactory arrangement to both parties. Every effort is now being made to fork the water to the bottom of the mine, so that vigorous operations could be commenced on the lode discovered at the 130, worth 30*l.* per fathom. It is necessary to make rather a heavy call on the adventurers to meet the adverse balance, but when it is considered that 12 months have elapsed, and no demand made on the shareholders in the meantime, the charge is not so much as might reasonably have been expected. All superfluous machinery and materials have been disposed of, with the exception of about 400*l.* worth, which will be realised as soon as practicable. The committee have taken advantage of the offer of some stamps, &c., and have purchased them at a reasonable figure. We hope at the next meeting to be in a position to lay before you a more satisfactory statement of accounts, and a more favourable report as to the future prospects of the concern. In the meanwhile the shareholders may rest assured that every endeavour will be used to curtail expenses as far as is consistent with the development of the mine, and to place this valuable property in such a position as is justified by its well-known merits.

WEST TOLGUS MINING COMPANY.

A meeting of shareholders was held at the account-house on Monday,—Mr. J. TAYLOR, of London, presiding. A favourable report was anticipated, and there was a large attendance of adventurers.

The CHAIRMAN read the notice convening the meeting, and regarded with pleasure the fact that for once they had not found it necessary to say anything about calls in that circular. The accounts, as read from the chair, showed that the labour cost for April was 741*l.*, and for May 782*l.*, merchants' bills to the end of April 1273*l.*, charged on account of 13th month 120*l.*, making a total of 2918*l.* On the other hand, 478 tons of copper ore had been sold, which brought 2743*l.*, showing a loss on the two months' working of 174*l.* The cash account showed a balance against the adventurers brought forward of 1136*l.*, and, adding this to the present loss, there was a total debit balance of 1310*l.* Calls had been received which reduced that balance to 342*l.*, and the arrears of calls amounted to 64*l.* only, and at the next account this, he had no doubt, would be all paid, as the two persons who were in arrears were well able to pay, and it was no doubt through carelessness that they had not paid.

Mr. HEARD: Then the real fact is that after calling up 50,000*l.* of calls, you have about 60*l.* in arrear. That shows what a capital body of adventurers we have here.

The CHAIRMAN then read the agents' report, which was of a very favourable and promising character. After referring to the various points in the mine, the report concluded as follows:—

The lode in the 85 fm. level west is 8 ft. wide, yielding 12 tons of ore per fathom; dressing by six men, at 7*l.* 7*s.* per fathom. The rise, which was stated at the last meeting to be 11 fms. behind the end, has been communicated with the 75 fm. level, the lode yielding 8 tons of ore to begin with from the 85 fm. level; where holed, 5 tons per fathom. The rise men are set to stope west from the rise in the back of the 85 lode, yielding 10 tons of ore per fathom; worth 60*l.* per fathom. The lode in the 55 end east is 3 ft. wide, unproductive; driving by four men, at 6*l.* 10*s.* per fathom. There is one stope in the back of the 55, east of shaft, by six men, at 4*l.* 10*s.* per fathom; yielding 3½ tons, worth 20*l.* per fathom. Since our last meeting our prospects have continued to improve, the 125 and 85 having opened up very fine courses of ore for 8 fms. in length in each end, and the improvements in the 75 and 95 west lead us to hope that we may soon meet with courses of ore in them also. Our sales of ore for the next account realised 3934*l.* 1*s.* 3*d.*; this we anticipate will give a profit of 850*l.*, and enable us to pay off the debt against the mine and leave a surplus of about 500*l.* Our quantities of ore having increased, we have thought it advisable to have monthly sales, and accordingly sampled last week 200 tons of good ore as a first sale for the July and August account.

The CHAIRMAN observed that there were a few things to which he wished to draw the attention of the meeting. They would see what was stated in regard to their anticipations for the next two months, and he believed that hitherto their prophesies had been found to come pretty near the truth. The amount of ore raised they knew exactly, and the amount of costs had been estimated carefully. They had, from the accounts, read the certainty of having to meet a debt of 342*l.*, and that did not include dues. They were aware that they had not paid any dues in the mine for a long time past, and as yet they had had no demand for dues up to the closing of the accounts read that day; but he, of course, thought that they must anticipate that, when they could see their way clear to declare a profit, such a state of things could not continue, and they should anticipate that before the next account they would have to arrange with Lord Robartes as to what dues they should pay him, for that they would have to pay him some time or other he thought none of them would dispute. On one occasion their lord was good enough to reduce their dues from 1-20th to 1-40th; and afterwards, at his own pleasure and to their satisfaction, when he saw the condition they were in, he remitted them altogether. Of course they must leave it to him to determine what dues they should now pay, whether or not it should be 1-40th, which they paid before the total abandonment of the dues, or a higher rate. Anticipating that they would not have to pay more than 1-40th, the calculation would be that they would have a surplus of 500*l.* after paying this debt of 342*l.*, but if they had to pay further back there would be a small surplus. That was about the state of the concern at present, and they certainly had every reason to feel confidence at the fine courses of ore they had now opened up. Their two principal levels—the 125 and 85—would, there was no doubt, continue to improve, there being at present, so far from deteriorating, every appearance of their increasing in value, and in other levels there were indications in a similar direction. In the 75 and 95 they might hope soon for good bunches of ore, and in the 105 they expected speedily to be enabled to present a good report. Their old enemy the water had of late behaved better to them, and had caused them but little difficulty, but the price of coals was still high, and rendered the management of the water costly, and in getting proper men for this particular kind of work they had had considerable difficulty. In putting down the shaft they had some difficulty in getting good men, but they had been fortunate in obtaining some good sumpmen, but they were in a ticklish state, and were every now and then going away. They must try and keep them and add to them if they could.

Mr. HEARD thought that it was to the interest of Cornish mining that they should keep the men in the county, and pay them fair wages as an inducement to remain.——Capt. HANCOCK said their was no discontent amongst his men; they all seemed well satisfied, but the more wages that was given them, the more they would go abroad.——The accounts were passed and the balance carried forward to next account, and the business then terminated.

The adventurers afterwards dined together, and on the removal of the cloth, and after the usual loyal toasts were given,

The CHAIRMAN gave "Success to West Wheal Tolgus." For 14 years many who sat at the table had been drinking that toast, and that, too, at times when people had told them it was folly to indulge in any anticipations of the possibility of success. They had always, however, had confidence in the mine; they had had to struggle against adverse circumstances of one kind and another, and they had encountered nearly all those difficulties with which honest miners sometimes had to contend. At the present moment they seemed to have mastered these, and they had reached a point when the mine itself gave as great promise as they could ever hope for. If things went on in such a manner as they appeared likely to go on, he thought that they would soon see that which had been for a long time wanted in the county of Cornwall, a good copper mine. No good copper mine had certainly sprung up in their county for a great many years; there were what might be termed a few good ones, but he believed that they all had an idea that pretty soon West Tolgus would be the best of the lot. (Applause.) The difficulties the management had met had always been treated with great consideration by the adventures, and he felt grateful for the manner in which the committee had been supported in times when it had been much in need of sympathy. Encouragement had also been given to such an extent as few other mines in the county could boast of, by the lord of the mine, and of that they could not be unmindful. In the opinion of many of their friends, the smelters had served them worse than anyone else, but he confessed that he was not one of those who raised his voice in the cry against that class, for he thought that they had had difficulties with the rest of them, and he did not believe that they had acted with miners in an otherwise than fair spirit, nor did he think that their profits had been unreasonable. They had been obliged, like themselves, to bow to circumstances, and he trusted that they might now expect something better from that quarter. There had been, as they had perceived, a gradual, though not very large rise in the price of copper for some little time past, and the market had worn a much healthier tone. They might, therefore, he trusted, look forward to much better prices for their produce in the future. They only wanted good prices to give them good dividends, and to get West Tolgus into a fair and proper state for her to become a most durable and satisfactory mine for all connected. He trusted that as soon as they made a little profit, there would be no undue eagerness to "seize upon the prey," for he trusted that they would lay aside sufficient to protect them from the future casualties such as they had experienced, in order that from prosperity they should not be suddenly necessitated to demand calls from reluctant shareholders. He was happy to think they had now tided over their difficulties, and hoped West Tolgus would enjoy a long period of prosperity. (Loud applause.)

The CHAIRMAN next gave "The Health of Lord Robartes." He had so often had occasion to pass the highest encomiums on the conduct of the lord that he could now only remind them of the noble manner in which he had always treated them, never requiring to be begged and entreated to grant relief, but proving himself to be one who could, from personal knowledge of mining, appreciate the difficulties of mine adventurers. When he found them in difficulties he not only volunteered to remit the dues, but to pay back what he had received for a certain time. Lord Robartes was, in his mind, a model of a lord of mines, whom other owners of property in the county ought to follow. Lord Robartes had been as liberal in other cases as in theirs, and he had perfect confidence that when they came to him to ascertain what his intentions were for the future he would decide in a liberal and proper way. (Applause.)—*West Briton.*

[For remainder of Meetings see to-day's Journal.]

RECOGNITION OF APPLIED SCIENCE—THE CITIZENSHIP OF LONDON.

Among those who have energetically devoted themselves to the useful application of science Sir Charles Lyell, Bart., has long occupied a prominent position, and on June 25 his labours were substantially recognised by the Company of Turners in presenting him with the freedom and livery of the Guild at a Court specially held at the Guildhall. The room in which the ceremony took place was hung with diagrams of geological strata, and several interesting specimens of the science were exhibited in different portions of the apartment. The chair was occupied by Prof. Tennant, who is a past master of the association. There was a considerable number of persons present, including many ladies, to witness to the ceremony. Upon the Court being opened, and the minutes which had been passed at the last meeting read, the resolution whereby the company was authorised to present Sir Charles Lyell with its freedom was also made made known; it stated that the honour was conferred "for his original investigations and published communications respecting the structures and sources of materials used in the art of turning, as well as for his comprehensive and elaborate treatises upon the geology of all parts of the world."

The presentation was made on behalf of the Court by Mr. JOHN JONES, who said:—Sir Charles Lyell,—About five centuries ago—presumably about the time this company was incorporated—the municipality at Rome gave the laurel crown to a member of the Italian Bar, who had relinquished his profession for the more congenial study of philosophy and poetry. His writings had enriched and beautified his native language, and have ever since been a fund of thought and sentiment for the use of mankind. His name was Petrarch. About 30 years ago I was in Antwerp, and found the city decorated with allegorical paintings, with trees planted by the pathway, and with festoons of flowers from the houses, in celebration of the memory of one of their citizens, both a diplomatist and painter, whose works had given celebrity to the Flemish school, and have since remained an attraction to the world in the public gallery of the city. His name was Rubens. You, Sir Charles, have done as much for your countrymen as either of those distinguished men did for theirs. You, like the great Italian, relinquished the profession of the Bar for the more comprehensive study of geology. You have added a new department to the literature of England, and your volumes which contain your observations and inferences on the structure of the earth, while conveying information on the profound secrets of Nature, are so felicitously written that they fascinate like the pages of romance.

> Oh, Heaven! that one might read the book of fate,
> And see the revolution of the times
> Make mountains level, and the continent,
> Weary of solid firmness, melt itself
> Into the sea; and other times to see
> The beachy girdle of the ocean too wide for
> Neptune's hips!

Was the despairing exclamation of Shakespeare. What he regarded as the impossibility of a dream you have shown to be a phenomenon passing before our eyes. To every landscape of England you have added an additional charm, for every hillside and valley, every river and every plain, taught by you, yields us traces of the forces by which they have been configured—forces more potent than the armies of the Continent, which no diplomatic skill can baffle. Every wave and wind, every season and tempest, under your instruction, we recognise as members of those great forces of Nature by which the cosmical conditions are determined which govern the existence of our race. The hot blasts from the soil of Africa melt the snow on the Alps, and the wasting deluge desolates the plains of Lombardy; or the slow emergence of land at the Pole may render this island habitable only for the Esquimaux. In Bunyan's "Pilgrim's Progress" is a description of the Hill Difficulty and the Delectable Mountains. It is thought that St. Catherine's Hill, at Guildford, and the adjacent chalk ranges gave him the model which he pourtrayed, but under your teaching every cubic yard of every hill in England is entitled to the appellation "Difficulty" to the student in exploring the hidden lore of chemical and organic structures with which they are replete—the light by which he can read the records of primæval life, and assign to its place in the successive formations of the earth the substance under his notice. Sir Charles, we welcome you to the ranks of the Turners' Company, not because you have received favour from the Crown, the fountain of honour—not because the University of Cambridge has conferred on you academic degrees—not because you hold high rank in society, though that might be argument for admission into some of our less intellectual sister guilds—but because your work has promoted the art which we govern. Our present Chairman (the late worshipful Past-Master) taught us that the manipulatory skill with the graver against the revolving lathe is not sufficient to constitute an accomplished turner, not even the possession of a sense of beauty, which finds its expression in every shaving of his work, but that a knowledge of the materials on which he works his structure, their locality in the earth's storehouse, their characters—are all to be accounted as invaluable in a thorough turner. In our next competition we have offered prizes for work in metal, stone, and gems—all parts of the subject which you have cultivated. I have spoken of Rome and Antwerp. I need not say that the Turners' Company is not the Corporation of London, though I may say it is the most active section of that community, one that most loyally fulfils the obligations for which charters and political privileges have been granted, the advancement of the art to which we belong, failing which regard municipalies are but gilded beadledoms, and guilds but carousing companies. For centuries the names of the men with which I prefaced my remarks have given lustre to their respective cities. In centuries yet to come we may anticipate that the work we have done to-day will give lustre to the Turners' Company, and that some future historian will pay us honour when he finds on our rolls the name of Sir Charles Lyell.

At the conclusion of Mr. Jones's speech, Mr. Shirreff, the clerk of the Court, administered the oath to Sir Charles Lyell, after which that gentleman subscribed his name on the roll, amid the plaudits of those present.

Prof. TENNANT said: It is with pleasure, Sir Charles, that I have the honour to admit you to the freedom of the Turner's Company, of which I was last year Master. My successor—Mr. Sadgrove—requested me to take his place on this occasion. I beg to inform you that you were unanimously elected by the Court. In 1819 you were elected a F.G.S., and in 1831 the First Professor of Geology in King's College, succeeded by Prof. Phillips in 1834, who two months since was elected a freeman of this company, and I was in three weeks after attending his funeral at York. From 1853 to 1869 I held the Geological Chair at King's College, in addition to that which I still retain of Geological Mineralogy, and I am thus enabled to speak of your valuable services to geology. For upwards of 50 years the public have witnessed the zeal displayed by you in making known the great truths to be learnt by studying the rocks on which we tread when the science had to encounter opposition which you have greatly succeeded in suppressing. Your numerous works have contributed largely to decipher the hieroglyphical characters (not of Egypt, which are comparatively only of yesterday), but of organic beings of countless ages. These in many cases have left only fragments of the internal bony structure or external covering, and these imperfect evidences taken alone would not be safe, but placed in the hands of naturalists we become enabled to comprehend their geological history. In our public buildings, such as Westminster Abbey and the Temple Church we have these models of Creation accessible to all. At Hampton Court Palace may be seen on the pavement beautiful sections of the orthoceras. In the Midland Counties the chimney-pieces and floors are full of fossils, and become instructive museums. Your last book just published, "The Students Elements of Geology," has on the frontispiece three fossils characteristic of three important periods, and throughout its pages has information of the most useful kind; and I may add that the discovery of such interesting facts as I have mentioned has been greatly assisted by the publication of your works, which, when placed in the hands of the student, are a key to the great secrets of knowledge which the earth contains. For your many public services we are proud to enrol you a freeman of our company.

Sir C. LYELL, in reply, said: An allusion has been made to the very different feelings towards the science of geology which existed half a century ago, when I published my first work. I have good reason to remember the correspondence which I constantly had at that time with numbers of people who were greatly alarmed at the idea of believing that this globe was more than 5000 years old. And this had been affirmed by several lecturers at that time; by my friend Dr. Buckland in particular—the Rev. Dean Buckland—and had caused very great trouble and alarm. I am happy to say the time has come when there is so much

more freedom of opinion in this country, and fearlessness in avowing opinions, that there is no difficulty of the kind encountered by cultivators of geology. I have great reason to feel gratified by the compliment which has been paid to me in such eloquent terms to-day. (Hear, hear.) When I look at the list of distinguished men that you have already elected members of this guild, I can assure you that I highly appreciate the honour which you have done me, and, among other reasons, for the prizes which I see offered for public competition, and by the conferring of which you have done so much for the promotion of your branch of science. (Cheers.)

At the termination of the newly-elected member's speech, the addresses of Sir Charles Lyell, Prof. Tennant, and Mr. Jones were ordered to be entered upon the minutes, after which the proceedings came to a close.

FOREIGN MINES.

MALPASO GOLD WASHING.—C. R. Clarke, May 18: I wrote you last on April 28, since which we have been running day and night with a fair head of water until the 13th inst., when we began cleaning up. Our clean up gave us 145 amalgam, which retorted 56 ozs. 4 dwts. of gold. We now lack 200 ft. of being through the old wastes, and if Mr. Welton gives us water (which he promises on June 1) we will by August be washing all new dirt. Our banks still consist mostly of waste; the streak of blue cement (which I have described several times) lying up in the gravel has now become rather troublesome, as it now goes almost across the whole face, and it will require a great many peons to break it up as fast as it is caved down. The hard gravel underlying the machine, and through which we are carrying our sluice cuts, still shows dipping into the hill. Our banks are about 500 ft. ahead of the sluice, the gravel being carried by the water to the sluice through the cut in the hard gravel. I think our sluice will be on the bed-rock ere we reach the high banks with it. I shall add 40 or 50 ft. to the upper end of the sluice this week, and get everything in good order to make a long run, so that the banks may be reached as soon as possible. The general agent writes—"Medina Ditch: On the 12th inst. the ditch was finished, with the exception of three or four gates, and blasting a few rocks that were met with in excavating the channel of the ditch. Now the gates are the only delay to turning on the water, and these would have been finished but for the sawyers having left to go to the feasts. We have received great assistance from Mr. O'Reilly in the supply of tools for making the new ditch.—Malpaso Ditch: Up to the present a new ditch on the Cantarera stope has been considered almost impracticable, as it was stated that the ground was broken up by extensive workings, and consisted of a line of precipitous banks. Nothing, however, could be more wide of the facts of the case. I have now run the line for the new ditch, starting from a flume on the old ditch, a short distance above the point selected by Mr. Clarke for his bulkhead for the new main pipe, and carrying a ditch along the Cantarera slope, on the same glade as that of the Malabar ditch until I reached the Cantarera river. The total length of line was 13,713 ft., but the actual length would be about 15,000 ft., allowing for small bends not included in the line measures. The ground for the whole distance I found to be good, with the exception of some short pieces that were not worse than some portions of the ground on the line of the Malabar ditch. Very few flumes will be required, and the water can be taken from the Cantarera river without great expense. A very large flat exists near the head of the ditch, of about 50 acres in extent, that could be made into a reservoir if required; and in case of working the Pava Mine would serve splendidly as a deposit for the tailings from that mine. Finally, I am of opinion that a ditch can be made on the line run equal in every way to the ditch at Malabar. I left the men clearing the line of ditch of forest and brushwood, and since then the men who made the Medina ditch have been transferred to the Malpaso ditch. The new Malpaso ditch can, in my opinion, be completed in from six to eight months from this date to carry 1500 in. of water."

MALABAR GOLD WASHING.—May 7: The water is turned on about 1000 in. as far as the Andamios Gate, and from thence about 300 in. through the lower ditch to bulkhead, and through waste gate in bulkhead to mine. This is the first time that the Medina water has reached the mine.

May 8.—Water turned on 1000 in. through to the mine, but not through pipe.—Monitor and Distributors: All work about these finished. Water turned on to bulkhead 1000 in., of which some 200 in. ran down the pipe for the first time, and enabled us to stop leaks in pipe with sawdust. The pipe appears to be very well put together, and does not leak nearly so much as we anticipated. The whole rig appears to be excellently got up. We have not had the slightest hitch as yet.

May 9.—Washing began to-day. We turned on about 1200 inches of water, and run same through one 5½ inch nozzle, and one 4 inch. No. 1 monitor put to work opening grade; did excellent execution, and worked steadily all day.—Rocks, Stumps, and Roots: These will give us some trouble at first, until we get open. The roots especially are unavoidably numerous in opening ground which was a short time ago forest.—Ground Sluice: Heavy slides coming down all day, and running off through the sluice with the greatest facility. The cut is opening rapidly, and although the mass of clay between head of sluice and monitor is great there will be little difficulty in getting through it. One day's washing is sufficient to prove this.—Sluice runs admirably; put in a bank of quicksilver.—Gravel: Some rather good looking gravel has been uncovered before monitor No. 1. This is a matter of great importance, as it proves that the Spaniards did not work on pipe-clay as we supposed, but merely skimmed the top of the gravel as far as they could get grade without having to open a deep ground sluice (90 ft. at least), as we shall have to do. An enterprise of this sort was far beyond their capacity. We have great hope to find the gravel running deep, as the pipe-clay appears to form the head of a channel. One day's washing, however, cannot show us much.

May 11.—Bulk head: Carpenters and Peons raising sides, so as to hold enough to fill the pipe without running over, and the rest of the Peons clearing ground-sluice of roots and stumps of trees. The water was turned on as far as the Andamios ravine.

May 12.—Ground Sluice: Peons clearing the roots and blasting a few boulders. As the cut—the result of one day's working—is still narrow, we have necessarily to stop running until the run is clear. As we open out these stoppages will be much less frequent, as there will be room for the Peons to work on one side of the pit whilst piping proceeds on the other.—Accquia: Some slight repairs are also being effected on one or two weak points in the ditch.

May 13.—Washing turned on from 1000 to 1500 metres of water. No. 1 monitor set to piping with 5½ in. nozzle, 235 ft. pressure. No. 2 monitor, 4 in. nozzle, throwing a fine stream, but not yet brought into action, as we shall have to run some days with No. 1 to open out. As the ground is easy to run, our single monitor, throwing as it does a most powerful stream of water, brings down all the stuff we can run, as at least twice as much ground is constantly caving in from the ground sluice as comes from the banks now opening. The appearance of the gravel in the cut now opening in front of Monitor No. 1 is all we can expect, and prospects very well indeed. We have at least 12 ft. of solid ground uncovered, and it appears to go down. The bank on the east side is about 38 ft. high, and on the west 15 ft. or 20 ft. A few more days' washing will give us more insight into the depth and extent of the deposit.—Ground Sluice: This is cutting its way up and deepening fast. All this work is done by water charged with tailings, which comes from the mine. Ran about nine hours, with some interruptions, in order to remove roots from the channel.

May 14.—Feast day Ascension: Turned on from 1000 to 1500 in. water, and although we had but two Peons who volunteered to work, we made as good a day's work as yesterday, piping all day with No. 1. Everything working most satisfactorily, and an immense mass of ground (a large portion of it unproductive) running off: ran 10 hours. To-day's work proves that we can get along occasionally almost without Peons. A feast-day need never prevent us running, unless there be some breakage in the ditch or machinery.—Outlet: It is now pretty well proved that the ravine will keep itself clear, a most important point, as without this we would soon be buried up with tailings. We feel quite easy on this head now. The Undercurrent will be put in at an early date.

May 15.—Mine: Owing to the accumulation of roots and trunks in the ground sluice, and a few large boulders, washing will be suspended to-day and to-morrow for the purpose of clearing out these obstacles. We would keep on running, but it would be bad policy to do so, the gravel accumulates on and over the roots, and renders difficult to work advantageously; as our cut widens rapidly, these interruptions will soon cease.

May 16.—Peons engaged cutting up roots and blasting boulders, and picking up some pieces of pipe-clay.

May 17.—Sunday Washing: Turned on 1200 to 1500 in., worked monitor No. 1, 5½ in. nozzle, did excellent execution all day, and we have now a large opening before us, in which we hope the Peons will be able to cut up roots without our having to suspend piping. Ran about nine hours. The gravel and banks look quite satisfactory.

May 18.—Mine: All our men engaged with clearing roots, rocks, and breaking up pipe-clay. No water turned on.

May 19.—Washing proceeding to-day at time of dispatching mail.

RICA GOLD WASHING.—N. S. Welton, May 16: I was at the mine on the 11th and 12th inst., and the water account for the previous 14 days showed an average of six hours' work per day, but Messrs. Skinner and King informed me that twelve hours' work per day would have been done during most of the time but for constant breakages on the ditch. The mine is now so opened out that a good view of the gravel can be obtained, and the bank looks much better than I have ever seen it. The bed rock appears to be much cracked, and heaved up in parts, but it still dips north-east. I resolved to take advantage of the favourable weather, and not clean up till the end of this month; the result of this clean up will be very important, as it will be the first run during which anything like work has been done. I observed the manner in which the gravel washed, and a piece of the bank that had slid down, and the bulk of which could be easily estimated, and which (taking it at the lowest estimate of three calculations made by myself and Messrs. Skinner and King) contained 8000 cubic feet was completely washed down the sluice in less than two hours. From my observation of the washing of the Malpaso gravel I am quite certain that a constant supply of 200 inches of water at Rica would wash more gravel than 700 in. would at Malpaso.

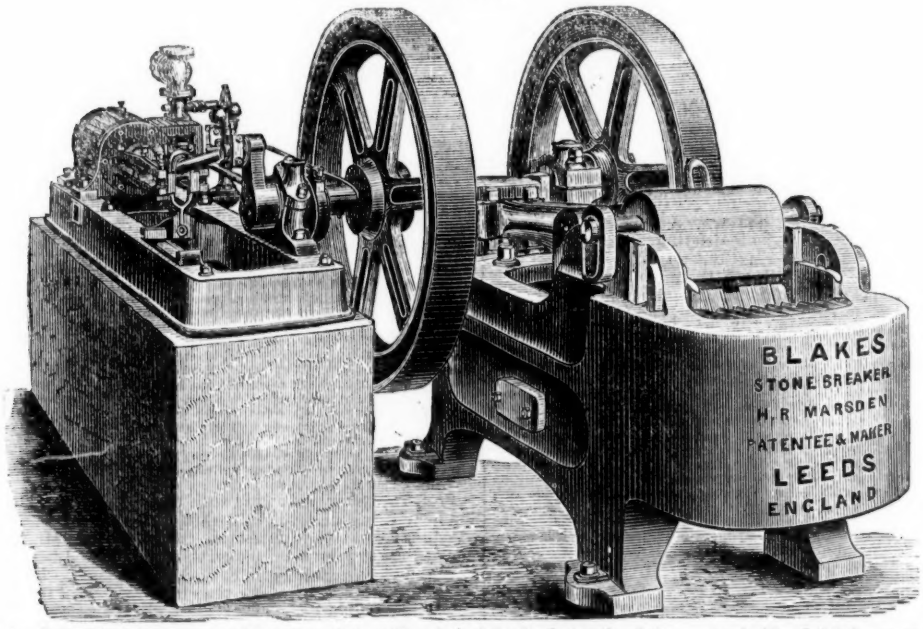
[For remainder of Foreign Mines see to-day's Journal.]

MINING IN UTAH.—The Emma is now employing 115 men, and things look lively about the mine. The concentrators are in full blast, and work nicely. The ore is taken at the dump and shoveled through coarse screens or sieves. The coarse pieces that will not pass through are sorted, and the ore sacked. All that passes through is shoveled into an incline slummer, with a bottom of different sized screens, where two water-pipes play on the ore as it passes through the slummer, and all the fine ore and sand that pass through the upper and finest screen goes into a spout, in which a stream of water is running, and is carried down the hill one-fourth of a mile to the lower works. The remainder, which passes through the lower screens, is taken from boxes where it is received, and passed through jiggers, where it receives a thorough stirring and shaking, and the ore being heavier than the waste the most of it settles to the bottom. The top is taken off, and looked carefully over, and all pieces of ore that are left are sorted out and sacked. All fine ore is run into spouts, and carried by the water to the lower works, which consist of a series of sluice-boxes similar to those used in the placer mines. The waste is run off to the dump, and the ore sacked ready for shipment. It is the intention of the managers of the mine to soon erect a crusher at the mine, where the ore will be crushed to a suitable size to go into the jiggers, and thus avoid the necessity of running through the first set of screens. The concentrators have a capacity of turning out 25 tons daily, or 75 tons as it comes from the mine. Said ore is worth from $75 to $85 per ton after it has passed through the above process.—To London Readers: I will here say for the benefit of "Sinex" and the London readers of the *Tribune*, that all the machinery in connection with the concentrators was built last season, and run four months, and after paying all expenses (building and machinery included) left a net profit to the company of $60,000 for the four months' run. For proof I refer him to the report for 1873, issued to the stockholders from the Emma office in London. So much for the profit of working the second-class ore. As to the other questions—Whether this second-class ore stands in reserve of ground connected with high-grade ore or otherwise, and whether the present daily shipments of high-grade ore come from the bottom of the mine, these questions have nothing to do with my first statement; namely, that the Emma would ship heavily this season. I will respectfully refer "Sinex" to Mr. Hannibal Williams, superintendent of said mine, for the information he seeks.—*Salt Lake Daily Tribune*, June 10.

DESCRIPTION OF A

NEW COMBINED STONE-BREAKER AND STEAM-ENGINE.

BY H. R. MARSDEN, PATENTEE.



The machine is of the kind known as "Marsden's Patent Toggle Lever Machine," and is of a size to admit a stone whose end section would measure 20 in. by 9 in. The framework is in one casting of considerable strength and weight, and has two arms carried in the rear of the machine, in which are inserted adjustable gun-metal bearings, in which is carried the crank-shaft. This shaft is of the best selected scrap-iron forged solid and slotted out. A long end is left on the engine side, upon which at opposite centres is keyed the engine-crank or disc. Two objects are secured by this arrangement:—1. The weight of the moving parts of the engine act as counter-weights or balances to those of the machine; and 2. To place the crank of the engine in its most favourable position as regards power, to overcome the point of greatest resistance in the machine, which always occurs when the lever stands in its vertical position; thus, when the piston is about the middle of its stroke the lever assumes the position named. The blow is struck with the greatest force the engine is capable of exerting, and at a time when the velocities of all moving parts are at the highest.

The operation of Crushing or Breaking may be briefly described as consisting of a swinging jaw fitted with a renewable face of chilled cast-iron operating against a similar jaw fixed (but reversible) in the main frame at the end. Movement is given to the swinging jaw by means of a vertical lever, mounted on a stud, and capable not only of oscillating therein, but capable of a forward and backward movement by reason of the alteration in the angularity of the back toggle plate; on each side of this lever, and in the same plane as the stud, are two notches into which the toggle plates press, the back one resting in a casting at the rear of the machine, whilst the front one rests in a notch in the swing jaw. By the oscillation of the lever, operated by the crank through a strong connecting-rod, the jaw is caused to approach and recede from the fixed jaw twice for each revolution of the crank, or one nip for every time the lever stands in a vertical position.

As piston speed was necessarily limited, some contrivance was absolutely necessary to apply a direct-acting steam-engine without belt, gearing, or countershaft; this has been most satisfactorily accomplished, and large numbers are being made on this plan. The engine has one cylinder 11 in. in diameter by 20 in. stroke, is very substantial in appearance, and has a separate eccentric to work the expansion valve. The cut-off point can be regulated by a hand-wheel at the back, whilst the engine is moving from ⅛ to ½ stroke, to suit either high or low pressures of steam. The speed of the engine is 125 revolutions per minute, and every part is designed to suit this speed; large wearing surface and ample means of adjustment, two massive fly-wheels are provided, and the whole well and substantially put together; with 40 lbs. of steam the combined machine would break down, suitable for road metal, from 100 to 130 tons of furnace slag per day of 10 hours, at a cost of 3d. per ton.

The machine is fitted with H. R. Marsden's New Patent Cubing Jaws, and will be shown in operation throughout the duration of the show of the Royal Agricultural Society at Bedford.

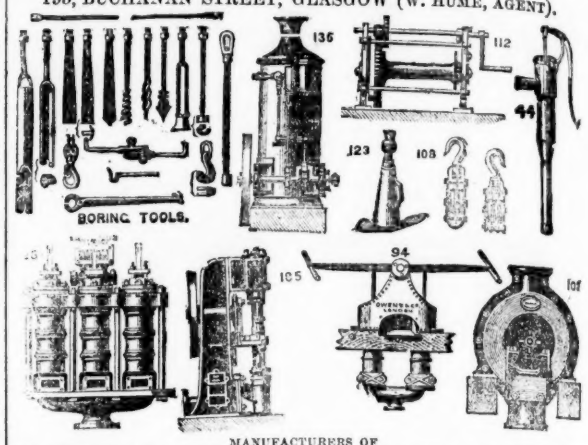
S. OWENS AND CO.,

Hydraulic and General Engineers,

WHITEFRIARSSTREET, FLEETSTREET, LONDON

AND AT

195, BUCHANAN STREET, GLASGOW (W. HUME, AGENT).



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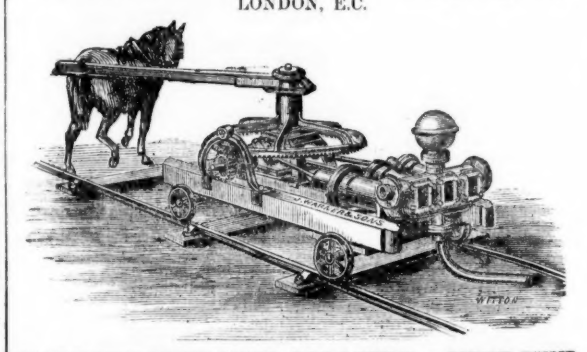

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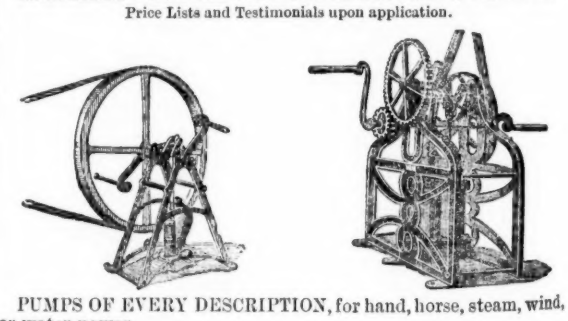

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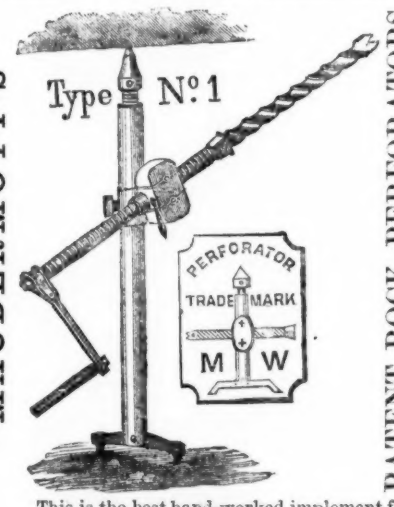

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This is the best hand-worked implement for colliery purposes extant. It can be carried about, set up, taken down, and worked by one man. It bores vertically upward as well as in any other direction. The rate of work is at least four times as great as by the usual methods. The hole made is straight and uniform, and, therefore, specially adapted for the use of cartridges.

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A Special Type for Overground Work and Shaft Sinking.

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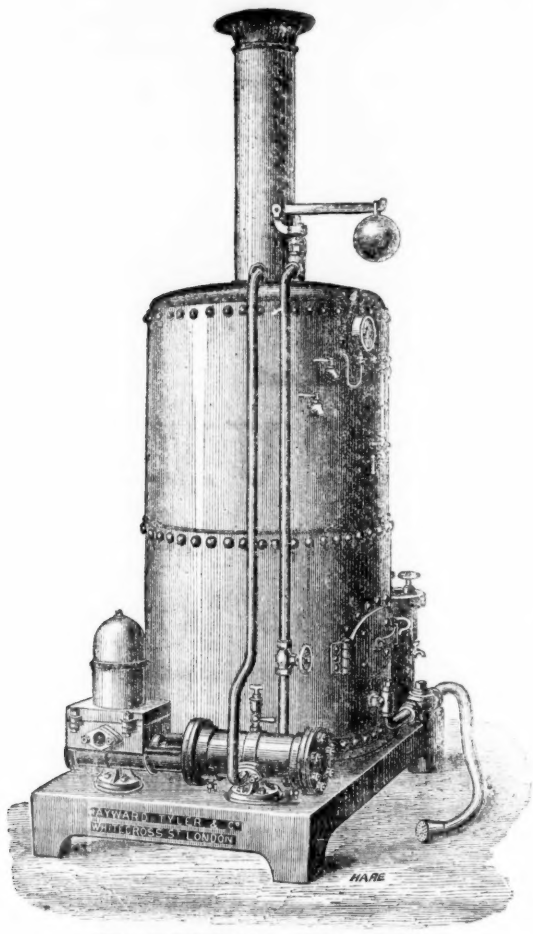
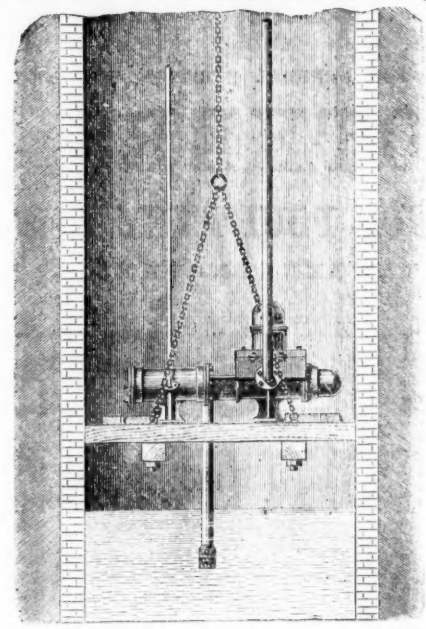


THE "UNIVERSAL," WITH BOILER.

"Important to buyers of this Steam Pump is a specimen of one of the steam valves, shown after working for more than two years. It is without any wear, without even a scratch, and the marks of the tool can be seen."—*Engineer*, Dec. 13, 1872.



SHOWING THE "UNIVERSAL" SLUNG IN "DROWNED-OUT' PITS.

"It is a fact that, although there are a variety of Direct-acting Steam Pumps in the Exhibition, none that we have noticed works so quietly."—*Engineer*, Aug. 1, 1873.

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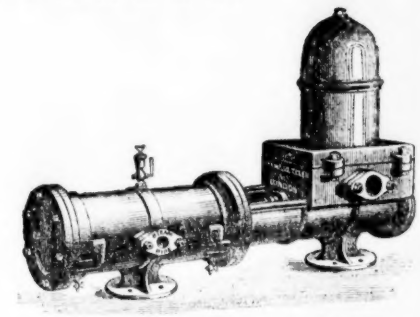
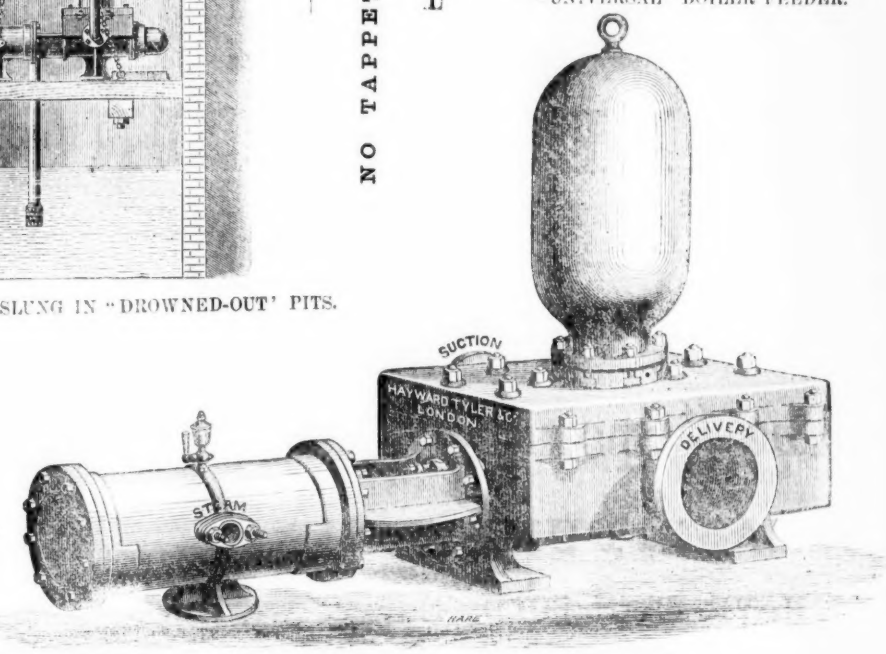


"UNIVERSAL" BOILER FEEDER.



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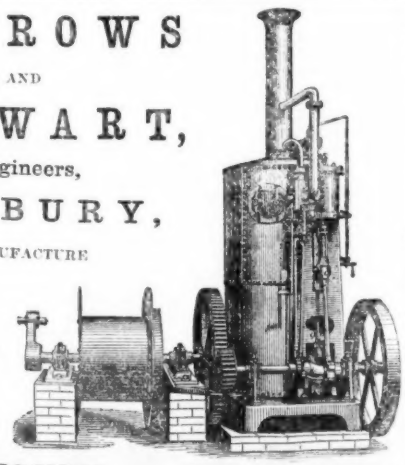

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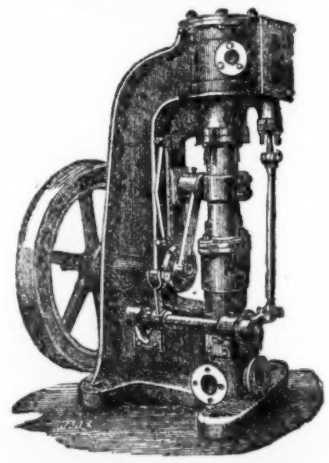

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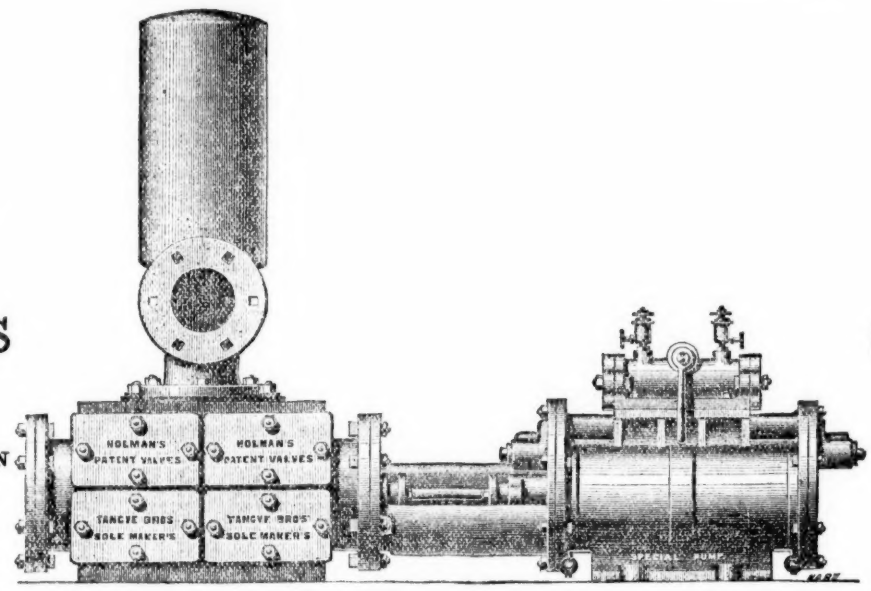

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Diameter of Water Cylinder ....Inches	1½	2	3	4	3	4	5	3	4	5	6	3	4	5	6	7	4	5
Length of Stroke ....Inches	9	9	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Gallons per hour	680	815	1830	3250	1830	3250	5070	1830	3250	5070	7330	1830	3250	5070	7330	9750	3250	5070
Price ....£	16	18	20	25	22 10	27 10	32 10	25	30	35	40	30	35	40	45	50	40	45

CONTINUED.

Diameter of Steam Cylinder....Inches	8	8	8	9	9	9	9	9	10	10	10	10	10	10	12	12	12	12
Diameter of Water Cylinder....Inches	6	7	8	5	6	7	8	9	5	6	7	8	9	10	6	7	8	9
Length of Stroke....Inches	12	12	18	12	12	12	18	24	12	12	12	18	24	24	18	18	18	24
Gallons per hour....	7330	9750	13,000	5070	7330	9750	13,000	16,519	5070	7330	9750	13,000	16,519	20,000	7330	9750	13,000	16,519
Price ....£	50	55	65	50	55	60	70	85	55	60	65	75	90	100	75	80	85	110

CONTINUED.

Diameter of Steam Cylinder....Inches	12	12	14	14	14	14	14	14	16	16	16	16	16	18	18	18	18	
Diameter of Water Cylinder....Inches	10	12	7	8	9	10	12	14	8	9	10	12	14	9	10	12	14	
Length of Stroke....Inches	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	
Gallons per hour....	20,000	30,000	9750	13,000	16,519	20,000	30,000	40,000	13,000	16,519	20,000	30,000	40,000	16,519	20,000	30,000	40,000	
Price ....£	120	140	110	120	130	140	160	180	140	150	160	180	200	190	200	220	240	

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The "Special" Steam Pumps can be worked by Compressed Air as well as by Steam.

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ESTIMATES ON APPLICATION AT 8, UNION COURT, OLD BROAD STREET, LONDON, E.C.

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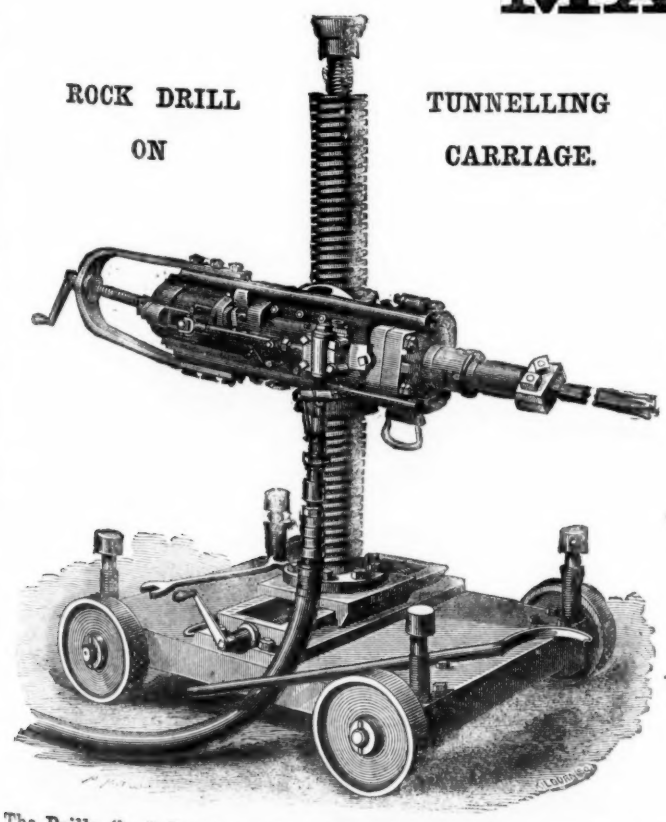

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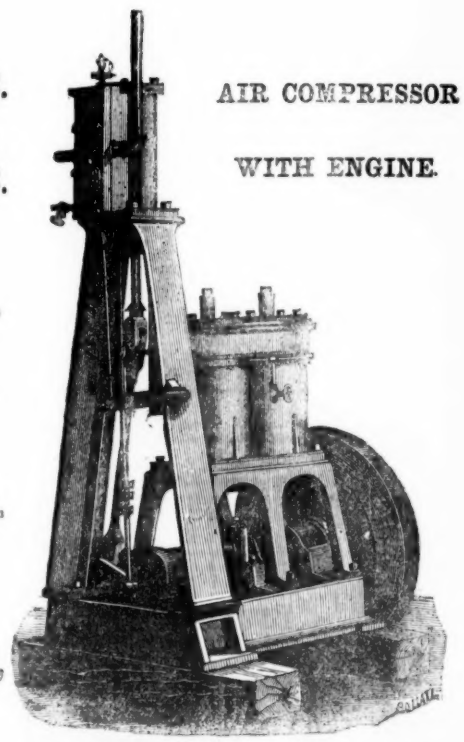

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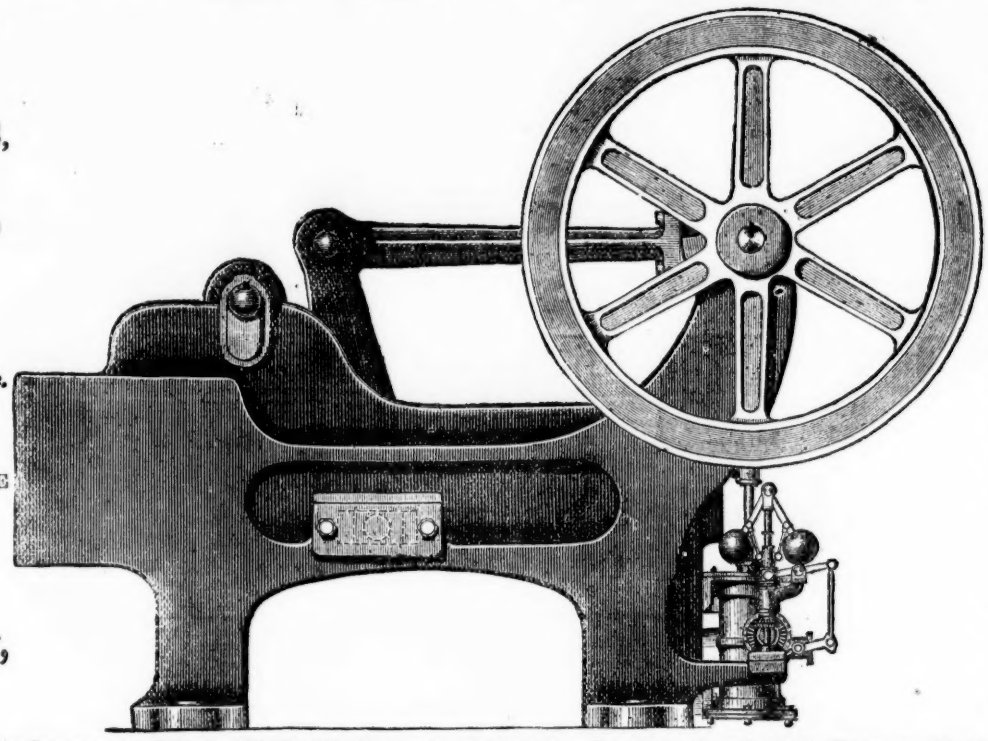

To be seen in full operation at the ROYAL OF ENGLAND SHOW, BEDFORD, July 13, 14, 15, 16, and 17, FIVE of H. R. M.'s new PATENT MACHINE STONE BREAKERS and ORE CRUSHERS, with MACHINES AND ENGINES combined. Also Traction, Portable, and Horizontal Engines.

All are requested to bring samples of any hard materials they may wish to see crushed or broken.

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Steel Colliery Wheels
WITH
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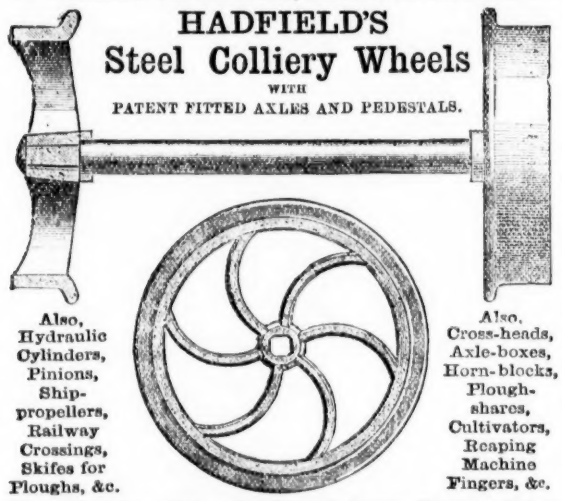

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MANUFACTURERS OF EVERY DESCRIPTION OF
CRUCIBLE CAST STEEL CASTINGS,
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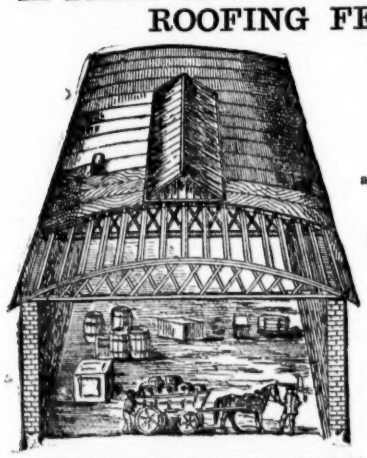

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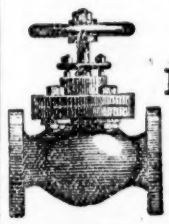

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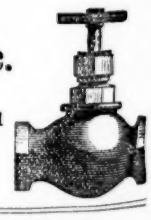

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